

## NOVEMBER 1946

## WASTE TOLERANCE PRODUCTION PERMITS

# No Compromise

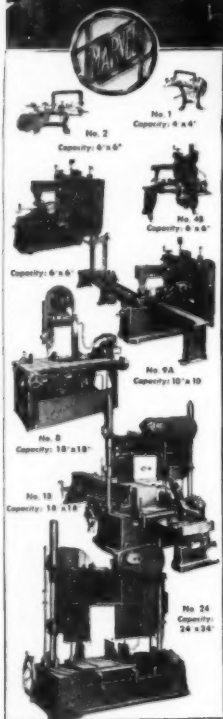
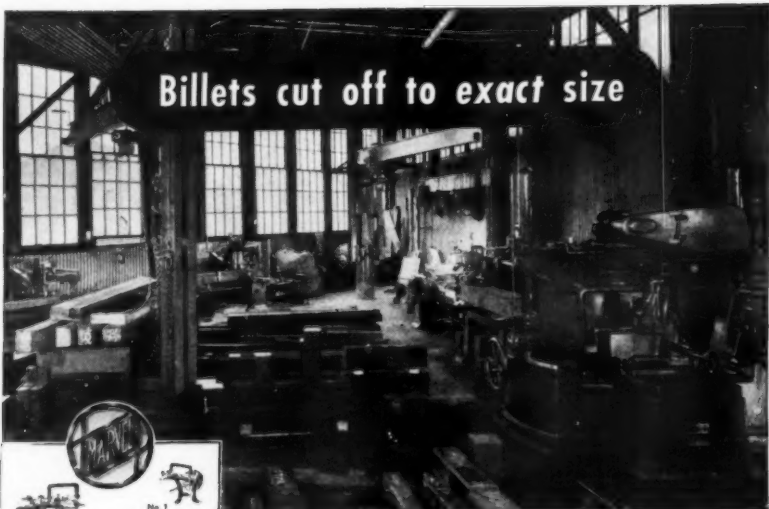
**in  
GAGE  
QUALITY**

**Where accuracy**  
of parts can determine  
the preference for prod-  
ucts in competitive  
markets, good business  
judgment dictates the  
use of only the best gages  
obtainable. Lincoln  
Park produces them.

*Supplied in*  
STEEL • CHROME PLATE  
TUNGSTEN CARBIDE

*Lincoln Park* INDUSTRIES, INC.

1731 FERRIS AVENUE • DETROIT 25, MICHIGAN



## Any Quantity cut-off automatically

These MARVEL Saws are money makers for this modern forge shop in many ways. (1st) they cut off billets for a small fraction of the cost of cutting-off with a hammer. (2nd) these billets are so accurate in size that they exactly fill the dies with no excess fin, not only simplifying trimming and finishing, but getting extra billets from many bars. (3rd) they keep all hammers busy on **production** work for these "world's fastest" saws can keep ahead of any schedule. (4th) they reduce cutting-off labor costs to an absolute minimum. It takes only one operator and a helper to keep all of these saws running because all but the No. 18 Giant Hydraulic Saw (at the right) are **automatic**-feed measure, and cut-off identical billets; requiring no more attention than automatic screw machines.

Your local MARVEL Sawing Engineer will gladly call and explain how you can add these five extra profits to your forge operation.

**ARMSTRONG-BLUM MFG. CO.**

*"The Hack Saw People"*

5700 Bloomingdale Ave.

Chicago 39, U.S.A.

Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

**MARVEL SAWS**



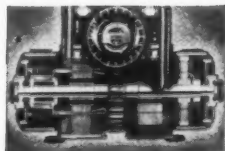
Weld with Selective **MULTI-RANGE**



Weld with "Exclusive" **REMOTE CONTROL**

Enjoy Smooth Welding Performance with this

## **HOBART** Gasoline Drive Arc Welder



**Balanced Design.** Note sturdy design of Hobart Welder that guarantees longer life.



**Idling Device.** When not actually welding, motor is cut to idling speed.

**Better Welds** are easier to get with Hobart convenience and operation features. The Multi-Range control provides 1000 combinations of voltage and amperage from which the operator selects the exact welding heat for superior quality welds. Reduces production costs!

**Faster Welding** is made possible with Hobart's Remote Control Dial which the operator takes with him to the work. Regardless of where he may be—high in air, or underground—he makes volt-amp corrections and adjustments without returning to machine. Saves labor costs!

**Easy Operation.** Push-button starting, double-hinged locking side panels, economical counter-balanced engine, battery ignition, variable speed governor, built-in fuel tank—are features you get in a Hobart Gasoline Drive Arc Welder to make your welding job easier, faster and better. Use coupon for details.

**HOBART BROTHERS COMPANY, BOX TB-116, TROY, OHIO**

"One of the World's Largest Builders of Arc Welders"

**FREE** How many of these "Fast Pocket Guides" do you want for your welding men? Has handy tables, charts, etc., for quick reference.

**HOBART BROTHERS CO., BOX TB-116, TROY, OHIO**

I'm interested in Hobart Arc Welders. Please send \_\_\_\_\_ Free Books, and also information on items checked below:

☐ Electric Drive ☐ Gasoline Drive

**NAME** \_\_\_\_\_

**FIRM** \_\_\_\_\_

**ADDRESS** \_\_\_\_\_



**BALL  
TURNING**

**SPIRAL  
CUTTING**

**MILLING**

**GRINDING**

**MULTIPLE  
OPERATIONS**

**RELIEVING**

**SLOTING**

**FORMING**

**PAPER  
TURNING**

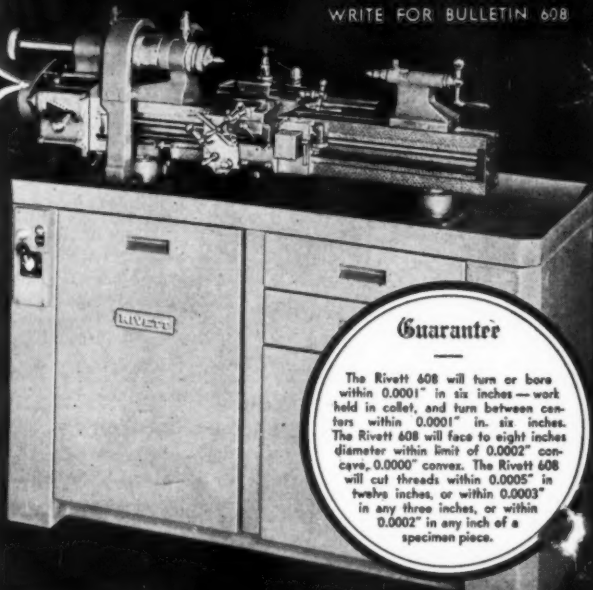
all possible through  
precision-made at-  
tachments.

# ALL THIS *and*

# PRECISION *too*

No. 608 back-geared, screw cutting, bench lathe for tool making and instrument shops where handling of a greater variety of jobs in minimum time is important. This small but exceedingly proficient lathe with slide areas equal to that of one twice its size permits the operator to finish his work completely without employing other machines, and, throughout the entire series of operations, utilize the inherent precision of the lathe itself.

WRITE FOR BULLETIN 608



### Guarantee

The Rivett 608 will turn or bore within 0.0001" in six inches — work held in collet, and turn between centers within 0.0001" in six inches. The Rivett 608 will face to eight inches diameter within limit of 0.0002" concave, 0.0000" convex. The Rivett 608 will cut threads within 0.0005" in twelve inches, or within 0.0003" in any three inches, or within 0.0002" in any inch of a specimen piece.

## RIVETT LATHE & GRINDER INC.

BRIGHTON, BOSTON, MASS., U.S.A.



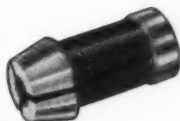


Style "B" Master Feed Fingers and Pads

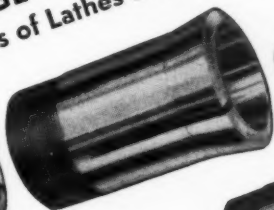
**HARDINGE Precision Collets and Feed Fingers for  
all makes of Automatics, Turret Lathes and Chucking Machines**



Style "S" Sure-Grip  
Master Collets and Pads



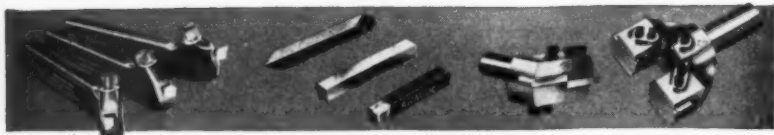
**HARDINGE Precision Collets  
for all makes of Lathes and Milling Machines**



**"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"**

# ARMSTRONG

*Quality* **TOOLS**



**ARMSTRONG TOOL HOLDERS**  
Permanent, multi-purpose tools, for every operation on Lathes, Planers, Slotters and Shapers.

**ARMSTRONG HIGH SPEED**  
Ready-to-grind Bits... Ground Cutters.  
**ARMALLOY Cast Alloy CUTTER-BITS**  
**ARMIDE Carbide-Tipped CUTTERS**  
6 cutter shapes, 12 sizes—2 grades.

**ARMSTRONG Turret Lathe and Screw Machine TOOL HOLDERS**  
Drill Holders, Cutter Holders, Finishing and Knurling Tools for standard operations.



**ARMSTRONG Drop Forged DOGS**  
Lathe Dogs, Milling Machine Dogs, and Clamp Dogs. 12 types, all sizes.

**ARMSTRONG Drop Forged "C" CLAMPS**  
Heavy Duty, Medium Service, Deep Throat, and Tool Makers' types in all sizes. Also Machinists' Clamps.

**ARMSTRONG Setting Up Tools**  
A complete line of Drop Forged Strap Clamps, Planer and Bracing Jacks and T-slot Bolts.

**ARMSTRONG Drop Forged Eye Bolts**  
Plain or shoulder pattern. Drop Forged and heat treated.



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All steel wearing parts hardened. Packer, Railroad, Standard, and Short types, both plain and reversible.

**ARMSTRONG Drop Forged Wrenches**  
Both Carbon and Alloy Steel. Over 100 types in all sizes. Improved designs, steels, and heat treating... stronger.

**ARMSTRONG Detachable Socket Wrenches**  
All sizes and types with driving handles, extensions, and drop forged ratchets. Sold singly or in cased sets.

**ARMSTRONG Machine Shop Specialties**  
Drill Drifts, Tool Posts, Drill Holders, Cutter Grinding Holders, and Tool Makers' Vises.



## ARMSTRONG BROS.

Better Pipe Tools. A complete line, each a better tool with hardened, alloy or drop forged parts wherever they will add to strength or tool life.

## ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"  
308 N. FRANCISCO AVE. CHICAGO 12, U.S.A.  
Eastern Whse. and Sales: 199 Lafayette St., New York 12, N.Y.  
Pacific Coast Whse. and Sales Office: 1275 Mission St., San Francisco 3, Calif.

# Machine Tool Blue Book

Hitchcock Publishing Co., 542 So. Dearborn St., Chicago 5

Published Monthly

NOVEMBER 1946

Volume 42, No. 11

Featured in This Issue	129
Editor's Page	131
Design Considerations for Welded Machinery Parts	135
By George L. Snyder	
Precision Measurement	159
By Warren Baker	
Air Power in Machines	183
By James McMartin	
Letter from England	191
By Robert Hutcheson	
Fundamentals of Export Selling	205
By Ralph Colorado	
Key Facts About Keys	223
By H. F. Williams	
Increasing Tank Production	241
By Howard Ginther	
Forty-fifth Annual Meeting National Machine Tool Builders' Association	243
Internal Grinding Practice	249
By John E. Hyler	
Carbide Drawing Die Practice	263
By Daniel Mapes	
News from Scotland	272
Carbide Nibs for Powder Molds	276
By Warren Baker	
It's Your Own Business	283
By Arthur Roberts	
Remote Control	288
By J. A. Richards	
Joint Preparation and Fit-Up for Welding	292
By L. K. Stringham	
Shop Hints	298
Your Tax Problems	301
By Arthur Roberts	
The Foremanship Forum	307
By Edmund Mottershead	
What's New in Metal Working	324
Increases Production with Dual Automatic Welding Set-Up	332
Let's Talk Shop	338
Available Literature	370
Mechanics Through the Ages	374
Advertiser's Products Index	390
Index to Advertisers	398



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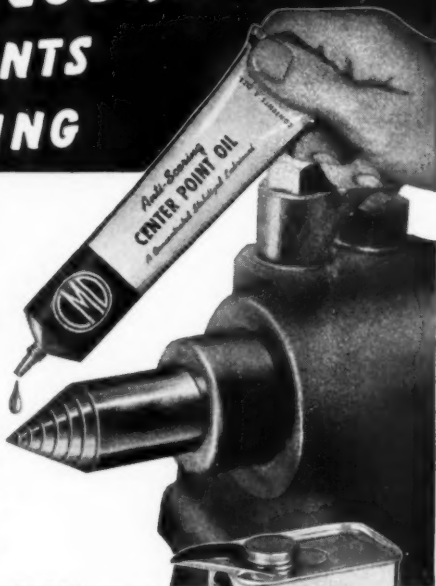
use



## Anti-Scoring LUBRICANT

Whether you use it on a center or a tool post screw, you will be convinced CMD Anti-Scoring Lubricant is a safe, sure, economical lubricant to use. It withstands pressures of more than 50,000 pounds per square inch and prevents any metal to metal contact.

Why not send for a test sample today? Your own test will prove it best.



MAIL COUPON FOR **FREE** SAMPLE

**CHICAGO MANUFACTURING & DISTRIBUTING CO.**  
Dept. 11BB, 1928 West 46th St., Chicago 9, Ill.

Without obligation, please send us a free sample kit of one tube of CMD Center Point Lube and one tube of CMD Center Point Oil. Also, send Catalog describing CMD Helical Groove Centers.

NAME.....

FIRM NAME.....

ADDRESS.....



**you wouldn't**

**Nor would you put carbide cutting tools on a lathe that cannot transmit the power to use them at their maximum efficiency. Carbide cutting tools have increased horsepower requirements as much as 300 per cent. They have increased cutting speeds 200 to 500 per cent.**

The chances are that turning accounts for 25 per cent or more of all machining time in your plant.

There are cases in our files of savings of hundreds of dollars a month in the manufacture of a single part by the use of Jones & Lamson machines. Our Turret Lathes and Fay Automatic Lathes are designed specifically for the most efficient use of carbide tools.

Be skeptical of the production efficiency of all metal turning equipment in your plant.

Telephone or write for a Jones & Lamson engineer who will be glad to consult with you on all phases of your metal turning problems.

### **What HORSEPOWER Are You Using?**

15 horsepower is required to take this 1/8" depth of cut on steel forging at 1000 RPM and .022" feed, with a carbide cutting tool, but carbide halves the cutting time.



**Engineered to "Carry the Load" for Most Productive Operation With Carbide Cutting Tools**



**JONES & LAMSON**

MACHINE COMPANY  
Springfield, Vermont, U.S.A.

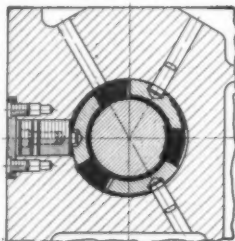
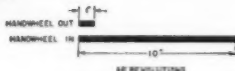
*Turret Lathes*

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies.

CINCINNATI

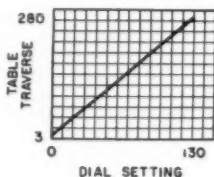


CINCINNATI FILMATIC 4<sup>th</sup> Plain Hydraulic Grinding Machine. Available in two sizes, 4" x 12" and 4" x 18", Catalog G-520 contains engineering specifications.

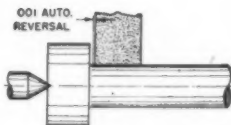


**FILMATIC SPINDLE BEARINGS.** Self-adjusting shoes produce independent, converging oil films which develop high radial pressures, forcing grinding wheel spindle into central position and keeping it there. No down time is ever charged against FILMATIC bearings.

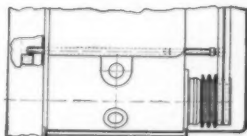
Chart above illustrates distance table travels in ten revolutions of handwheel. Slow speed for grinding shoulders; high speed for setting up is ten times faster.



Infinitely variable table traverse speeds—hydraulically powered, 3" to 280" per minute—the right speed for every job, including wheel truing.



Accurate table reversal within .001", an important feature when grinding next to shoulders; reduces spoilage.



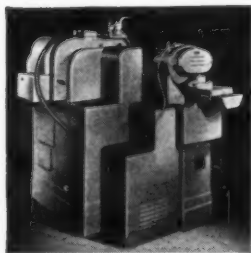
Two-speed grinding wheel drive has double diameter V-belt sheaves to provide increased wheel speed for worn wheels; increases wheel life.



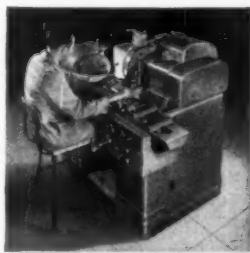
# FEATURES

## *that lower costs* OF GRINDING SMALL PRECISION WORK

● It takes a lot of figuring with a sharp pencil to reduce the cost of producing small precision ground parts, but it can be done, and perhaps at just as big a saving as the larger and more expensive parts. The illustrations on these pages will help you. They show several ways in which CINCINNATI FILMATIC 4" Plain Hydraulic Grinders lower the cost of grinding small precision work. In addition to these features there are other advantages such as: Independent Table Traverse Rate for truing the wheel; Exceptionally Accurate Sizing, adjustments in increments as small as .0001" on work diameters; Single Lever Control for table traverse, work rotation, and coolant; Dog Controlled Table Reciprocation from 1/16" to full stroke; Finger-tip Positive Stop for Cross Feed Handwheel; Rapid and Visible Pick Feed Adjustment, and many other features which combine to give you fast, accurate, low cost production for your small parts. Engineering data may be obtained by writing for catalog G-520. A brief description of this machine will be found in Sweet's Catalog File.



Left: Ample and effective coolant guards are shown in this rear view of the machine. Motors are protected from dust and moisture, minimizing electrical maintenance.



Right: Knee-hole in the new FILMATIC 4" Plain Hydraulic permits operation of the machine while the operator is comfortably seated.

## CINCINNATI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTER TYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

# THE RIGHT WAY TO GRIND MILLING CUTTERS

THIS  
INSTRUCTION  
BOOK  
**FREE**



As considerable misinformation exists about the grinding of milling cutters, we felt that the metal-working plants of the country could make good use of a booklet giving authoritative instruction on this vital subject. So, our engineers and designers—men who through two world wars have been making fine metal cutting tools—produced this booklet.

Along with numerous clear illustrations, it contains engineers' diagrams wherever dimensions, clearance angles and close

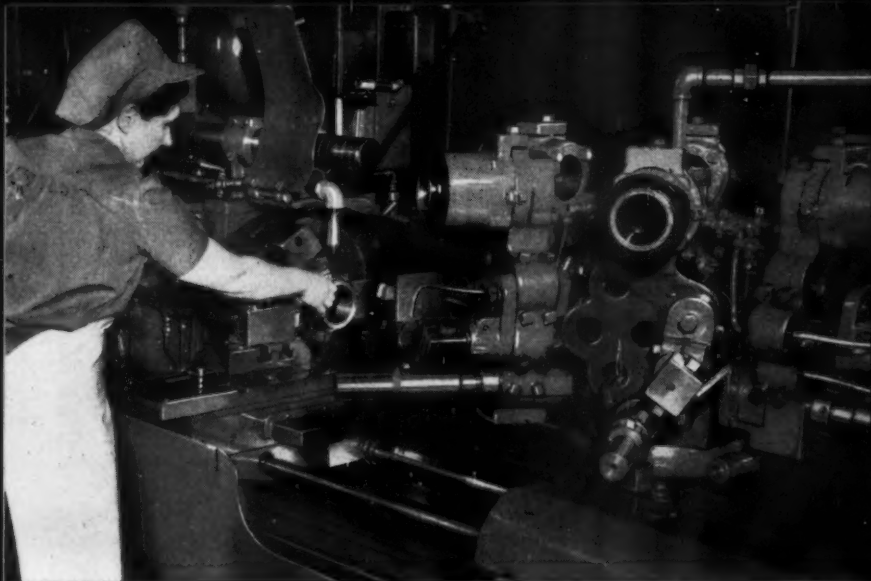
adjustments enter in. The booklet also contains a section on reblading inserted-blade milling cutters, with illustrations showing just how to remove and insert the blades without injury to the tool or loss of its efficiency. The booklet is free. Send for yours now.



INSERTED-BLADE METAL CUTTING

## TOOL SYSTEM

MANUFACTURED ONLY BY THE O K TOOL COMPANY, SHELTON, CONN., U. S. A.



## THREE PARTS PER TURRET CYCLE with Triplicate Tooling on the **FASTERMATIC**

Here's another way the adaptability of the Fastermatic can be used to advantage even on comparatively simple jobs.

To complete the turning of drive gears in two chuckings, two Fastermatics are used—one for each chucking. The turret of each machine is set up with three identical sets of tools so that a piece is both rough and finish turned with every second indexing. There is no skip indexing to waste production time. And still more production time is saved by the independent operation of the cross slides.

Whether it's high or low production machining, whether it's a few or a large number of operations per chucking, the Fastermatic provides a degree of flexibility that brings lower costs on a wide variety of work. With its automatic machining cycle, there is nothing for the operator to do but load and remove the work. Write for literature.

**GISHOLT MACHINE COMPANY**  
1185 East Washington Ave. • Madison 3, Wis.

*Look Ahead . . . Keep Ahead . . . with Gisholt*



*Rough Steel Forging*



*First Chucking*

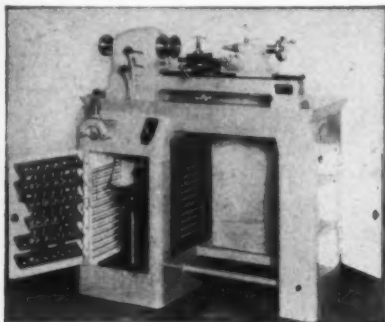


*Second Chucking*

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

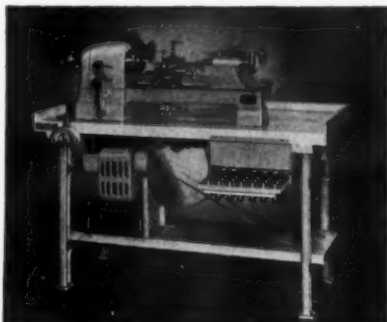
**ON SMALL DIAMETER  
PRECISION WORK . . .**

# Assure Ultra



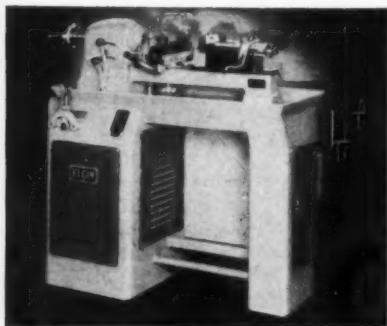
**Elgin Knee Hole Type Bench Lathe**

Has Variable Speed Drive with range from 120 to 3600 RPM. 9" swing, 17" between centers, 1" collet. Generous leg room for operator. Door of motor cabinet fitted with collet rack. Three roomy storage shelves.



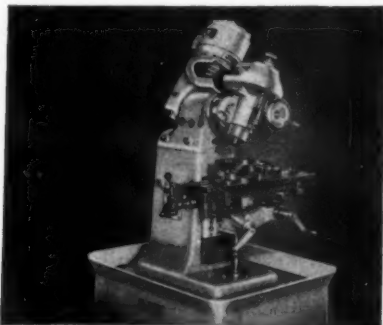
**Elgin Bench Lathe**

Laminated hard maple top, enclosed motor, safety guard for belt, handy collet drawer. Variable Speed Drive for any spindle speed from 120 to 3600 RPM. 9" swing, 17" between centers, 1" collet.



**Elgin Knee Hole Type Hand Screw Machine**

Variable Speed range, 120 to 3600 RPM. 9" swing, 1" collet capacity. Collet rack inside of motor compartment door. Independent coolant system (5 gal.) mounted in rear, outside—cleaner, more accessible.



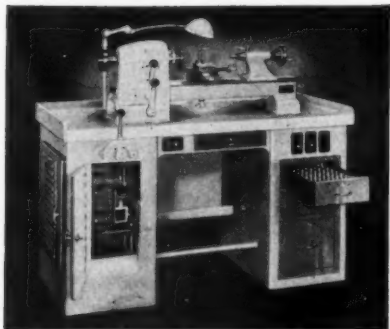
**Elgin Vertical Bench Milling Machine**

Prefloaded ball bearing spindle, 9/16" collet capacity. Five speeds ranging from 400 to 4000 RPM. Vertical travel of spindle, 1 3/4". Table 4 1/4" x 18". 90° swivel each side of center line.

## ★ ELGIN TOOL WORKS

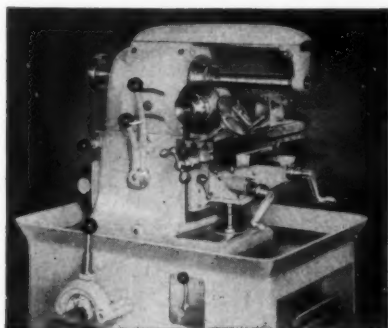
# Efficiency WITH

# ELGIN BENCH TOOLS



## Elgin Desk Type Bench Lathe

Variable Speed Drive, 40 to 4000 RPM. Low speed rate for grinding operations. Free turning spindle for truing-up and setting work by hand. Ample drawer space. 9" swing, 17" between centers, 1" collet.



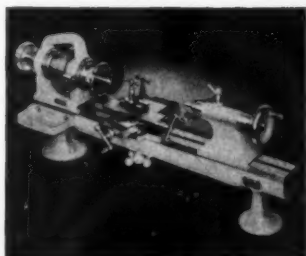
## Elgin Horizontal Bench Milling Machine

Variable Speed Drive, 35 to 2750 RPM. Collet capacity, 1". Table 4 1/2" x 18". Longitudinal travel, 12". Transverse travel, 6". Vertical travel, 6".

**1772 BERTEAU AVE.  
CHICAGO 13, ILL.**

The entire line of ELGIN High Speed Precision Bench Tools is designed to pay you dividends in better machining results, faster production, greater versatility, maximum operator convenience. The machines shown here assure "complete coverage" of your needs for both toolroom and production work. Note the trim, clean-cut lines . . . the provisions for operator comfort . . . the ample storage space for tools and accessories. And remember—the Elgin Bench Tools shown in the large illustrations (with exception of Vertical Miller) are equipped with the **VARIABLE SPEED DRIVE** which permits instant changes of spindle speeds over a wide range of RPM without stopping spindle and shifting belt. Operator is encouraged to use proper speed for each operation, changing as often as necessary . . . which means closer precision, better finishes. Write for specifications, prices, delivery dates!

## Two Lathes at Right (reading top to bottom)

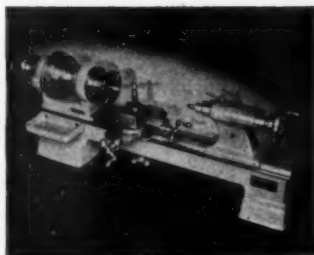


## (Upper) Model CB-5C Precision Bench Lathe

Open Cone Headstock. 1" collet capacity, 9" swing, 17" between centers, 36" bed. Speeds up to 4000 RPM. Flat belt only.

## (Lower) Model 4EV Precision Bench Lathe

Open Cone V-belt Headstock. For either V or flat belt. 7/16" collet capacity, 7" swing, 17" between centers, 32" bed. Speeds to 10,000 RPM.



# Look to SCHERR for latest developments in precision-production aids

## Measure to "tenths" at no extra cost

Without adding to the cost of the tool, the new Scherr Micrometer gives you a sharply inscribed vernier on the barrel which enables quick and accurate readings to 1/10,000". With this mike you can meet modern precision requirements in which "tenths" are common. It brings measuring up to date.

The Scherr Micrometer, made for many years under the name of "Reed," has the same long-lived accuracy and smooth, sensitive "feel" which have always distinguished it. 1", 2" and 3" models have the "tenths" vernier. Larger sizes read in thousandths. Sizes to 6" available at once, for immediate delivery. Price, 1" with locknut and ratchet, \$10.50, 1", no locknut and ratchet, \$9.00.

Also made in metric calibration, with and without locknut and ratchet.



### DIAL TEST INDICATOR



A superior instrument. Dust-proof case, unbreakable crystal. Stainless steel and bronze mechanism. Only 3 moving parts. Plunger hardened and ground. Dial adjustable for zero setting. Types with plain back or with universal ball joint. Various contact points. Clamp base or Scherr magnetic base which makes clamping unnecessary.

### SINE BAR

Thoroughly normalized, and carrying the Scherr accuracy guarantee. Type G has ground edges. Type L, lapped edges. Two sizes — 1"x $\frac{1}{2}$ "x5", and 1"x1 $\frac{1}{2}$ "x5". Extremely low price makes this valuable tool available for the individual owner as well as in quantity for the toolroom.



### PRECISION CALIPERS

Vernier gives reading to .001". Graduated on one side for inside measurement, on reverse side for external measurement. Graduations inscribed by a new photographic etch process to new accuracy and clearness. Several types, 4 sizes 6" to 36". In inch or metric.

### EXPORT AGENTS — FOREIGN VISITORS

Call at our extensive show room and examine these tools as well as the Scherr line of production equipment demonstrated under power.

### NEW SMALL TOOL CATALOG

Eight pages of data on these and other modern measuring tools, fully illustrated, showing how to check mikes for parallelism and flatness of spindle end and anvil. A valuable booklet FREE AT REQUEST.

GEO. **SCHERR**

CO., Inc.

202-C LAFAYETTE STREET  
NEW YORK 12, N. Y.

**Davis**

**THE CHARLES L. DAVIS COMPANY**  
 TAPPING MACHINES FLEXIBLE SHAFT MACHINES GROUND ROTARY P.  
**Middletown, Conn.**

# PEACETIME PRODUCTION MEANS BACK TO COMPETITION!

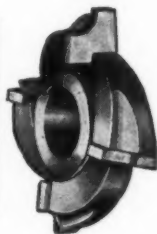
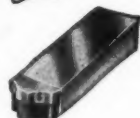
and here are the tools that  
will give you the "edge" on  
**COMPETITION!**

● Yes, peacetime production will have its problems, even as war production. Not the *same* problems, but just as tough. Competition will require tools that cut clean—fast—smooth—accurately.

You can depend upon MEYERS GENERATED CARBIDE-TIPPED FORM TOOLS to give you the "edge" on competition, by giving you more pieces per hour—more pieces between grinds—and a much smoother finish. On actual production runs, MEYERS GENERATED CARBIDE-TIPPED TOOLS have boosted production by more than 500%!

*Send us your prints for quotation*

**MEYERS GENERATED  
Carbide-Tipped  
FORM TOOLS**



**W. F. MEYERS COMPANY**

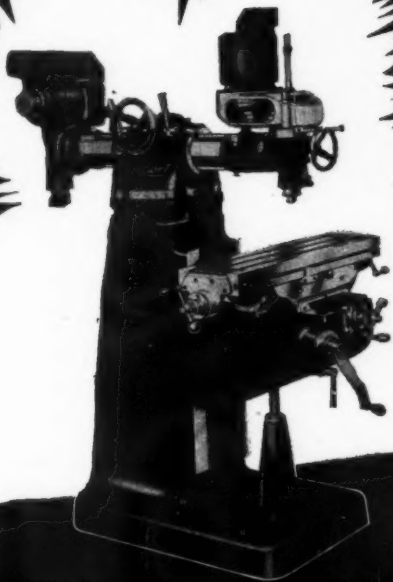
*Established 1888*

1012 FOURTEENTH STREET • BEDFORD, INDIANA



# the practical

TO YOUR  
MILLING  
PROBLEMS



THE  
BRIDGEPORT  
MILLING MACHINE

The Bridgeport Turret Milling Machine with High Speed Attachment handles milling, drilling and boring at all angles, with maximum ease and convenience. It is accurate and speedy, sturdy and

powerful—a precision machine for production demands.

Shaping operations can be performed at all angles, making this attachment fast and practical on die and mold work of all kinds, as well as for intricate slotting on production jobs.

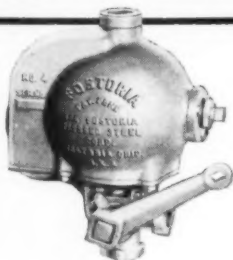
Features include: 15" diameter turret with 5" overarm, rugged construction, table, knee and saddle in convenient front-of-machine position, anti-friction bearings throughout, keyed overarm with worm wheel control for angular settings, large diameter graduated dials.

## Bridgeport

WRITE FOR BULLETIN

**MACHINES INC. BRIDGEPORT, CONN.**

# Faster-Better GRINDING



## Localized COOLANT Filtering

### CUTS COSTS

- ★  
Doubles Wheel Life
- ★  
Reduces Wheel Dressing
- ★  
Speeds Production
- ★  
Makes Finer Finishes
- ★  
Eliminates Spoilage

Leading manufacturers, everywhere, by their cost and production records, have proved the remarkable efficiency and economy of Fostoria Coolant Filters. Installed on individual grinding machines, this low-cost filter insures a constantly clean coolant, free from injurious foreign particles. Try a Fostoria Filter on approval — see the difference in finer finishes and faster, lower cost production.

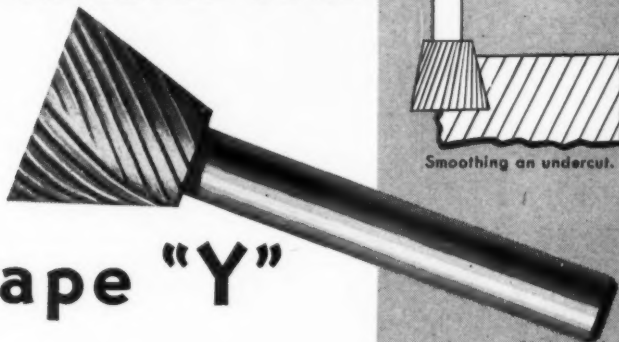


Write for complete facts on Fostoria Localized Coolant Filtering as used and recommended by nearly all grinder and hone manufacturers.

**THE FOSTORIA PRESSED STEEL CORP.**  
FOSTORIA, OHIO

# The Right BUR for the Job

THE INVERTED CONE



## Shape "Y"

Use for —

- Removing Imperfections on Castings and Parts with Undercuts
- Breaking Corners

The wide diversity of machine shop uses for P&W KELLER Burs is typified in Shape "Y"— a specially designed bur capable of doing many types of work. P&W KELLER Burs are ground from the solid by machine, for longer-lasting dependability. Write for circular on the other shapes and sizes of P&W KELLER Burs.

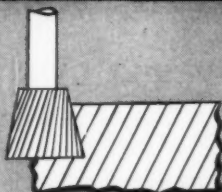


**PRATT & WHITNEY**

Division NILES-BEMENT-POND COMPANY

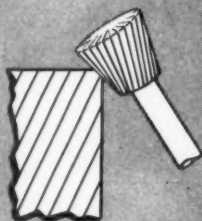
KELLERFLEX SALES DEPARTMENT

**WEST HARTFORD 1, CONN.**



Smoothing an undercut.

Shape "Y" is available in  $\frac{1}{8}$ " diameter with — and without — end cut.



Breaking a corner.

# No. 11 Leach Surface Grinder

**EXTRA LARGE  
CAPACITY**

**6" x 24" x 12"**

**HEIGHT 52"**

**WEIGHT 850 lbs.**

**\$591<sup>00</sup>**

Complete with motor of standard Current characteristics  
F. O. B. Factory.

**2 SPINDLE SPEEDS**  
2600 and 3500 R. P. M.



NATIONAL DISTRIBUTORS  
**H. LEACH MACHINERY CO.**  
387 CHARLES ST. PROVIDENCE 4, R. I.  
AGENTS IN ALL PRINCIPAL CITIES



## F-125 THE ROAD TO PRODUCTION

# This is the Road YOU Live by . . . .

History's hungriest market for manufactured goods is lined up beside the world's greatest facilities . . . still waiting.

It seems like simple common sense, then, to face the fact that YOU have a tremendous personal stake in seeing that more and better goods are produced through YOUR efforts than ever before. The Road to Production leads to individual security through PERMANENTLY improved living standards. It can take us far, or to a dead end, depending upon how each of us adapts himself to that first essential . . . MORE OUTPUT.

Federal specializes in upping efficiency through automatic welding, which offers more improvements in metal goods manufacture than any other single method or "tool" we know. Wherever metal fabricating or fastening on a production basis is a problem, resistance welders of one type or another usually provide a profitable solution.

Federal makes every type of resistance welder . . . many specially developed by our welding engineers for highly special needs.

Random examples of every-day production "step-ups" with Federals are illustrated at right. There's a Federal representative in every key city qualified to show you similar methods to speed your goods on the Road to Production.

*Production Provides Permanent Personal Prosperity*

**Look for this  
Sign at the  
Metal Show**

At Exhibit No. F-125 Federal has a production line in action, teaming Warco Production Presses with Federal Production Welders and making an interesting, marketable product.

THE

**Federal**

SUBSIDIARIES

Sammar and Adams Co., Cleveland—SPECIAL HIGH PRECISION MACHINES  
The Warren City Mfg. Co., Warren—WARCO PRESSES and PRESS GRABERS

**MACHINE**



FOUR SEAM WELDS AT ONCE... SIX SETS PER MINUTE

PROJECTION WELDING 11,500 AUTO DOOR  
HINGES PER SHIFT

SPOT WELDING DEEP FREEZER PARTS

BUTT OR MITRE WELDING ALUMINUM SASH

FLASH WELDING 300 STEEL DRUMS PER HOUR

**AND WELDER COMPANY**

**216 DANA STREET • WARREN, OHIO**





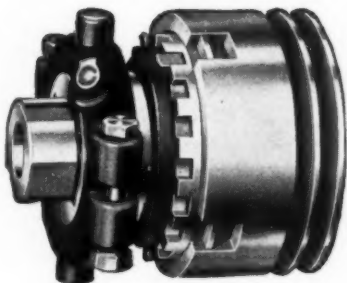
## SMOOTH RUNNING POWER

No interference . . . with an uninterrupted flow of smooth power as the goal. Perfect balance and full-floating contact with constant teamwork between power-source and equipment.

# CONWAY CLUTCHES

**STANDARDIZED WITH ALL PARTS  
INTERCHANGEABLE**

Precision designed and engineered . . . simplified so there are no superfluous parts . . . completely enclosed . . . instant stopping and starting . . . drag-free idling . . . tough steel extra thick plates . . . patented in U.S.A. and Canada.



### *Conway XYZ Type Fractional Power Disc Clutch*

Single, tandem, triple and six-plate assemblies and in double-throw arrangements, embracing all features of Conway design and construction.

*Write for Bulletin 345*

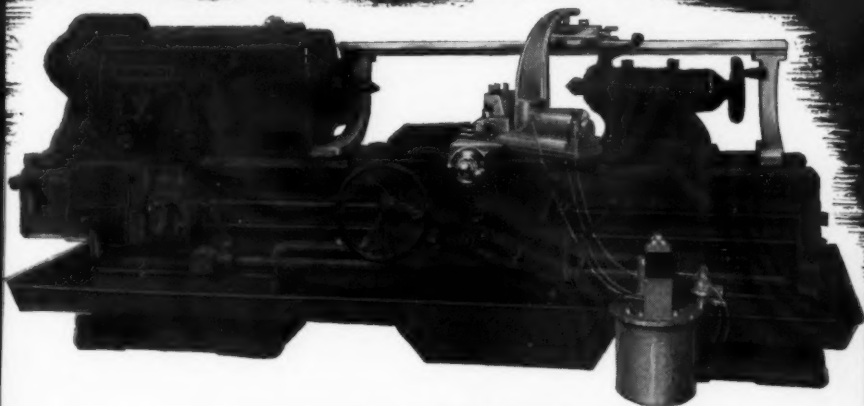
**THE CONWAY CLUTCH CO.**

**1541 Queen City Ave.**

**Cincinnati 14, Ohio**



## FOR TURNING CONTOURS AND STEP SHAFTS



THE NEW EXCLUSIVE

# MONARCH "AIR-TRACER"

FORMERLY KNOWN AS THE BAILEY DUPLICATING ATTACHMENT

Stepless increasing contours—machined to correspond to the template within a limit of tenths—and with a continuous finish that often eliminates grinding operations!

That's the kind of work you can do—and faster—with a new Monarch "AIR-TRACER" equipped with the. You'll get greater precision—greater production—on increasing contours and on step shaft work, too. (Automatic sizing is an important integral feature.)

The "AIR-TRACER" has a proved production record for saving time, money and material on such diversified work as mandrels, punches, dies, nozzles, pinning chucks, impellers, valves, metering pins, molds—and a wide range of step shafts.

If you're doing these classes of work, you'll want to know all about the new Monarch "AIR-TRACER", offered exclusively on new Monarch Turning Machines equipped at the factory. You can get complete, detailed information in Bulletin 2601. Ask for your copy.

### *Check these advantages*

- ★ Stepless cutting-tool motion—for increasing contours and a superior continuous finish.
- ★ Air-gage sensitivity combined with hydraulic power's versatility and ease of control—an exclusive Monarch feature.
- ★ Automatic sizing eliminates repetitive setups and measurements—for faster production, fewer rejects.
- ★ Continuous feed of slide on increasing diameters—for more uniformly high finishes.
- ★ Exact conformance to template contours—changes in template shape translated instantly into slide movement.
- ★ Feed infinitely variable from 0 to 20" per minute—for maximum machining efficiency on all materials and diameters.

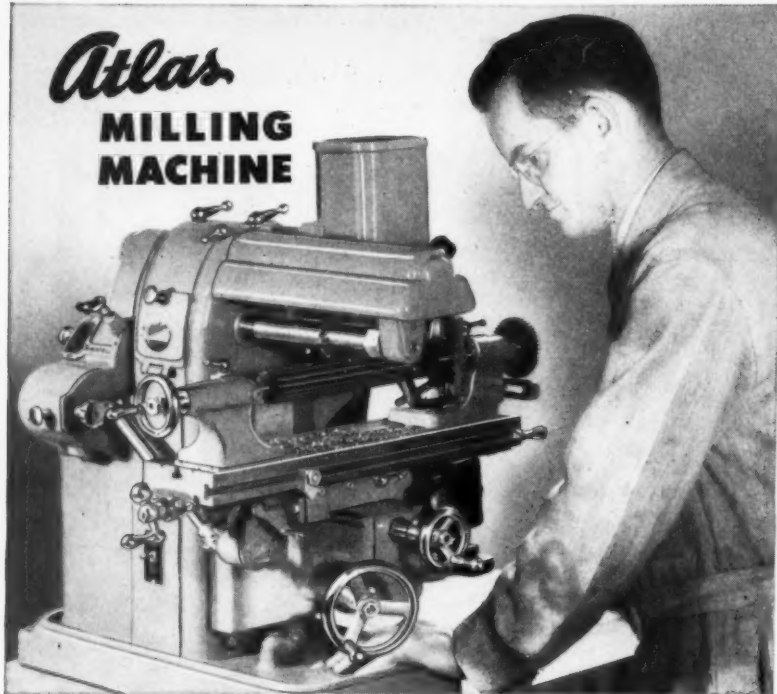


**THE MONARCH MACHINE TOOL CO.**

Sidney, Ohio

*Monarch*  
TURNING MACHINE

# Atlas MILLING MACHINE



## SMALL PARTS "SPECIALIST"

When you "match the machine to the job" by using the compact Atlas milling machine rather than an unnecessarily large machine for all small parts milling operations, you save in every way. Its initial cost is low. It requires less set-up time and effort. Easily-mastered controls permit use of apprentice operators. And power cost is less—1/3 HP motor operates.

The table is 4½" x 18" and travels 10" longitudinally, 3½" cross table. There are 8 spindle speeds from 62 to 2870 RPM. Timken equipped. Choice of manual, lever, or Change-O-Matic table controls. Adding air chuck and control devices makes a semi-automatic machine capable of surprising production feats. Send for catalog.

### PROMPT DELIVERY!

Based on current production increases—unless returns from this announcement swamp us—your Atlas distributor can put a milling machine in your plant a few weeks after you place your order.

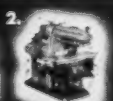
**ATLAS PRESS COMPANY**  
1150 N. PITCHER ST.  
KALAMAZOO 13D, MICHIGAN



**4** *Atlas*  
**TOOL TEAM**  
FOR  
**SMALL-PARTS MACHINING**



LATHES



MILLING MACHINES



SHAPERS



DRILL PRESSES

# DoALL *Contour Sawing*

★ ★ ★

World's Fastest Metal-Removing Process  
The Miracle Method of Low-Cost Production



Differing from all other metal-cutting processes *Contour Sawing* is the only economical process for countless production jobs. It cuts parts, even intricate shapes with internal and external contours, in minutes—not hours or days.

A tough, variable-speed band with hundreds of razor-sharp teeth—so hard that even a file won't nick them—slices off metal as thick as 30"—does not consume time "shaving" metal to worthless chips. Continuous cutting—no wasted backstroke.

You'll be amazed how *Contour Sawing* "cuts down time". Write for illustrated booklet "DoALL Equals Ten Plus", which compares time savings of *Contour Sawing* with other processes.

*The* **DoALL** *Company*  
Reg. U.S. Pat. Off.



DoALL STORES  
IN PRINCIPAL CITIES

MACHINE-TOOL DIVISION  
MINNEAPOLIS 4, MINN.

*then he said to himself:*

## **Tell the people what's cookin'**

Master of the picturesque is Fiorello H. LaGuardia. Asked why he chose a radio spot after relinquishing the Mayor spot in New York . . . his simple answer:

"People ought to be told what's going on."

And, there's plenty going on in industry that people can be told about:

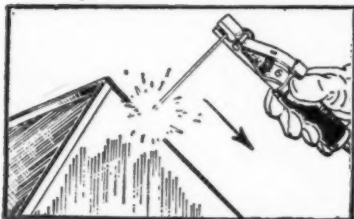
. . . new designs . . . new techniques that give the people more value for less money. For example:





**LOOK, MR. LA GUARDIA, how manufacturers are stepping out in front with the world's leading welding electrode:**

## "Cooking" with Fleetweld . . .



**Going downgrade 33% faster.** This fabricator was welding corner joints in 18 gauge galvanized steel at an arc speed of 30" per min. At the suggestion of the Lincoln Engineer, he started tilting the joint 45° and welding downhill with "Fleetweld 35". Increased speed to 40" per min. . . 33% faster.



**Jigging up for 16% lower cost.** Use of jigs to improve fit-up of parts and positioners to get downhand welding usually permits use of larger electrodes. In welding of this tapping machine frame, electrode size went from 5/32" to 3/16" "Fleetweld 7". Welding cost went down 16%.



**Using "arc force" to boost speed 20%.** Fillet welds in flat and horizontal positions are being made with 1/4" "Fleetweld 11" and "Fleet-Fillet" Technique at arc speeds of 12" per min. where former method gave 10" per min. This mining machine transmission case is a typical application. Full details in Bul. 444.



**The sign of good "cooking".** When you see 3 DOTS on an electrode, you know you have genuine "Fleetweld" . . . the world's leader for **low cost, speed and quality.** New, handy pocket manual giving procedures for all kinds of jobs free on request. Ask for Bul. 437.

**New Lincoln sound-color movies available free for showing to groups.**

**Write for information.**

**THE LINCOLN ELECTRIC COMPANY**

**DEPT. 502**

**CLEVELAND 1, OHIO**

*America's greatest natural recourse*  
**ARC WELDING**

FOR INCREASED  
*Production ...*  
**REMEMBER**



**LIMA GEARSHIFT DRIVES**

for all types of machine tools  
requiring selective speeds.  
Capacities  $\frac{1}{2}$  to 20 hp.



**THE LIMA ELECTRIC MOTOR CO.**

**244 FINDLAY ROAD**

**LIMA, OHIO**

REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES

LIMA PEDESTAL GRINDERS - LIMA ELECTRIC MOTORS



# *Avoid* CUTTER GRINDING PROBLEMS!

## the OLIVER ACE

*Grinds Difficult Cutters Easily*

It's no problem to keep cutters in tip top performance when sharpened on the "ACE" . . . Scientifically designed the "ACE" Cutter Grinder requires few attachments for sharpening the average run of milling cutters . . . *It is accurate — It is handy — It is universal* — the Oliver ACE handles a wider range of cutters . . . Try the "ACE" in your toolroom.

*Write For Illustrated Literature*

**OLIVER INSTRUMENT CO.**

1408 E. Maumee St.,  
ADRIAN, MICH.

IMPROVE YOUR TOOLROOM  
IT'S THE BACKBONE  
OF PRODUCTION

**OLIVER**  
OF ADRIAN



AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DIEMAKING MACHINES

## WHICH CLAMPING DEVICE MEETS *Your* NEED?



**D**o you have to hold small assemblies for drilling or welding? Are you required to hold work at odd angles? Is clamping space limited? Must you exert great pressure to hold parts?

**I**n a word: What are your clamping problems?

Knu-Vise, through many years, has learned the most efficient way to coordinate clamping operations with production requirements; and this background of experience can be made valuable to you.

Knu-Vise toggle-action clamping devices (only a few shown here) are recognized for their bull-dog grip and quick release, and their capability of simplifying and increasing production.

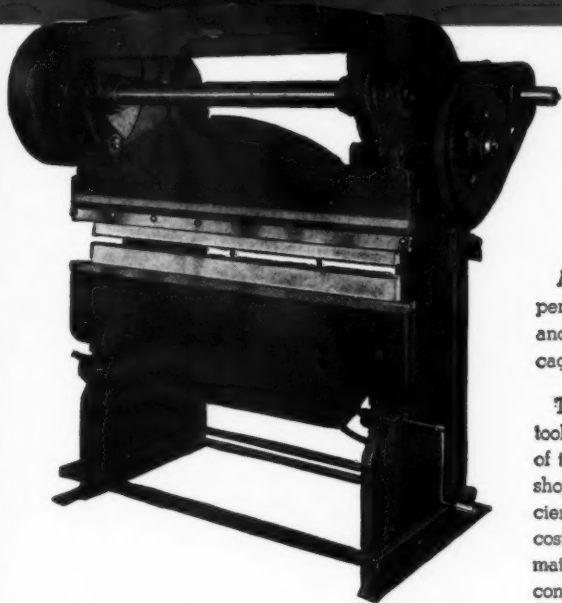
Ask us for any help you need in clamping operations. In the meantime, would you like a catalog?

**KNU-VISE**  
INCORPORATED

1334 PLUM STREET, DETROIT 16, MICH.  
4328 SAN FERNANDO RD. GLENDALE, CALIF.



# *Powerful* CHICAGO STEEL PRESS BRAKE



## • **TYPE** **"300"** •

A POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Forming Presses.

This money-saving production tool will handle 40 to 50 percent of the work done in an average shop. Greater speed, higher efficiency—much lower operating cost—plus the highest quality material and sturdy steel welded construction as in our larger machines.

—3 sizes—capacities 10 gage, 4 ft. long; 12 gage, 5 ft. long; 14 gage, 6 ft. long. Powered by 1½ h. p. motor.

We also build special machines for intricate bending operations.

Take advantage of our experience of over 45 years by sending to us any difficult bending problem you have.

WORLD'S LARGEST MANUFACTURER OF HAND BENDING,  
POWER BENDING AND POWER PRESS BRAKES

**DREIS & KRUMP MANUFACTURING CO.**  
7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS  
SEND FOR NEW BOOK "FORMING PRESS DIES AND THEIR USES"

# There is *More Usable Abrasive* in **32 Alundum** Grinding Wheels

**A**LUMINUM oxide abrasives of the so-called "regular" type are about 95% abrasive and 5% impurities in the form of slag. Slag does not cut. Aluminum oxide abrasives of the "white" type are over 99% pure abrasive but contain a large percentage of pores. Pores do no cutting.

32 ALUNDUM abrasive has a purity of over 99% and no slag, no pores — it's all *usable* abrasive. This means that the many cutting points on the grains of 32 ALUNDUM have more resistance to dulling. And when they finally become dull the slight impurities present in 32 ALUNDUM abrasive are beneficial inasmuch as they give the grains a desirable type of fracture — producing further cutting points.

It is this slower dulling action of the points, plus the fact that here are more of them doing the work, which give the new 32 ALUNDUM grinding wheels their long life and freedom from dressing.

**NORTON COMPANY, WORCESTER 6, MASS.**

*Distributors in All Principal Cities*

W-1077B



**NORTON ABRASIVES**

Trade mark reg. U. S. Pat. Off.

Ask your Norton abrasive engineer to give you a Vectograph demonstration of 32 ALUNDUM abrasive.

**"Fastest and coolest cutting wheel  
we ever had."**

**"Fastest and coolest... we ever had."**

That is what the tool room man of a large plant said after trying a 32 ALUNDUM wheel. They had always found a certain 46 grit, K grade wheel best for cutters, reamers and end mills. But by changing to a 32A5-K5VBE they found that stock was removed faster with a much improved finish. The "32" wheel also held corner better and cut cooler, leaving the tools a nice, bright finish.

ARE MANY  
OF THE  
REPORTS THAT  
ARE COMING  
IN ABOUT  
**32 Alundum**

**Six times around a 10" cutter  
without dressing.**

A high speed steel 10" diameter mixing cutter with 18 inserted teeth each  $\frac{3}{8} \times 1\frac{1}{2}$ " was ground with a standard 46 grit, K grade wheel taking off .002" each pass for two revolutions. On the second revolution the last two or three teeth were burned a bright blue. On the third revolution, also taking off .002" at the teeth blue, and the wheel showed all distinct glazes of steel.

With a 32 ALUMINUM wheel of the same grain and grade (32A46-KSVBE) .002" was removed from the teeth for each of six revolutions of the cutter. There was no burn and no wheel loading.

**Hole taper eliminated —  
wheel life tripled.**

**wheel life tripled.**  
A maker of rayon pumps is grinding holes in a part made of high carbon, high chrome steel (SAE 51335 — Rockwell C56-57) removing .012" from each hole. They had tried many makes of wheels and the best was an average of 10 holes per wheel. They changed to 32 ALUMINUM wheels ( $\frac{3}{8} \times \frac{3}{8} \times \frac{1}{8}$ " — 32A801-N8VB8) and life jumped to an average of 30 holes per wheel. They say, "The 32 ALUMINUM wheel breaks down only .002" per hole. Not only is this less than anything we have used before but the wheels remain true so that we can get a straight hole without any taper."

**Difficult job done in half the time  
with better finish.**

**...with better finish. ...half the time**

A machine tool maker was having a difficult time grinding flat a cast iron core plate (35% steel scrap) because action of the wheel. Changing to a 32 ALUMINUM wheel easily removes .020 -  $20 \times 6 \times 10^{-3}$  solved the problem. It compared to .010" - .030" of stock between dressings can feed .002" per pass as against .001" The "32" wheel makes less sparking-out time. Grinding time for both sides of the core plate went from 35 to 40 minutes down to 20 minutes. Finish was better than any obtainable before.

**Wheel cost cut 60%**

**cost cut 60%**  
For grinding welds and steel castings with a portable grinder, a manufacturer changed to a 32 ALUNDUM cup wheel (32A161-R4B5). Wheel life was increased three times with good cut and finish. Wheel cost per day dropped from \$3.38 to \$1.29.

These **POPE** PRECISION SPINDLES are  
ready to go to work in your grinders



This POPE Sealed Motorized Spindle is recommended for all makes of 6" x 15" surface grinders. It has sealed-in 1 H.P. G-E motor and sealed lubrication, SKF super-precision, double row roller bearings. It assures finer finishes and more production per day and per Spindle.



This POPE Internal Grinding Spindle with sealed lubrication and speeds up to 35,000 RPM is recommended for the production of more accurate hole sizes and better finishes. It comes in a wide range of sizes and speeds.



This POPE Motorized Spindle, with Sealed Lubrication and with 3, 5 or 10 H.P. motor running at 1200, 1800 or 3600 RPM is recommended for a broad range of surface grinder and boring applications. It has the bearing capacity and the rigidity to rough off surplus metal fast and produce a better final finish. It will run in any position.



This POPE Tool and Cutter Grinder Spindle with Sealed Lubrication is operated by single V-belt drive at speeds up to 6000 RPM. It meets POPE standards of precision, efficiency and lasting performance. Fits standard grinders.



This POPE Double-Ended Spindle with Sealed Lubrication is designed for twin belt pulley center drive at speeds up to 6000 RPM. Fits standard grinders.

These modern "Package Units" have a sealed-in supply of lubricant good for the life of the bearings. Each is a product of extensive research and long experience in

the design and manufacture of Precision Spindles. For prompt action get in touch with Spindle headquarters ..

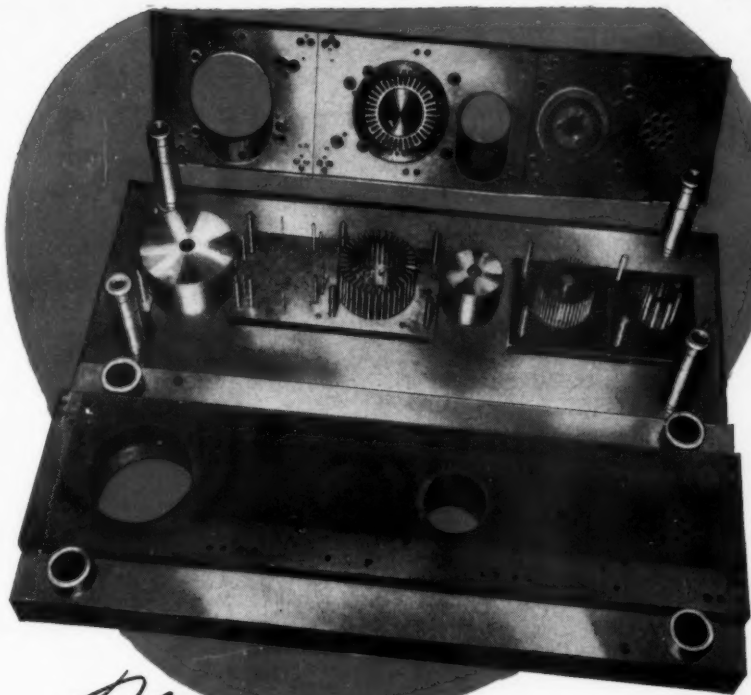
No. 38

# POPE

**POPE MACHINERY CORPORATION**

ESTABLISHED 1920

301 RIVER STREET • HAVERHILL, MASSACHUSETTS  
BUILDERS OF PRECISION SPINDLES



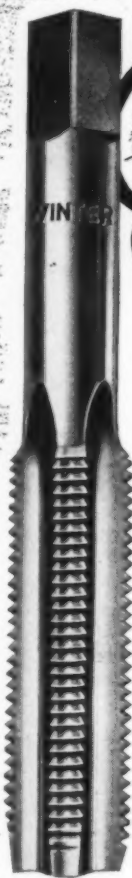
## *Masterpiece* by CROMOVAN

100,000 pieces per grind . . . 100% increase in production over former dies . . . is the outstanding performance of this Cromovan six station, progressive lamination die. The die punches out both rotor and stator laminations complete . . . from .025 silicon lamination sheets . . . clearance tolerance of .0007 inch per side is strictly maintained between punches and die. All cutting surfaces of this die are made of CROMOVAN.

Call ***First-Sterling***

**STEEL COMPANY** McKeesport, PA.

NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES



# Engineered

**TO MEET  
TODAY'S EXACTING  
PRODUCTION REQUIREMENTS**

Winter ENGINEERED Taps are designed  
for new threading accuracy

faster cutting action

large output and longer tap life

Winter's modern manufacturing methods  
close factory supervision and inspection

produce taps for high production

at exacting standards and

at lowest cost

Try Winter Taps on your next  
really tough tapping assignment

Your local distributor stocks them

A Winter factory-trained field engineer

is always glad to work with you on any new  
production problem

# Winter Brothers

**COMPANY**  **Wrentham, Massachusetts, U.S.A.**  
BRANCH STORES  
A DIVISION OF THE NATIONAL TWIST DRILL & TOOL CO., ROCHESTER, MICHIGAN  
SAN FRANCISCO CALIFORNIA-CHICAGO ILLINOIS-DETROIT, MICHIGAN

# UP TO 90% SAVING IN ANGULAR SET-UP TIME



COMPOUND  
OR  
SINGLE  
ANGLES  
for  
GRINDING



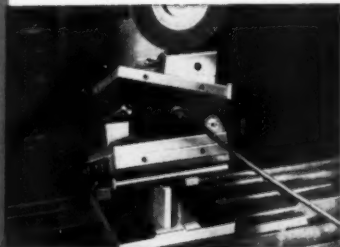
INSPECTION



JIG  
BORING

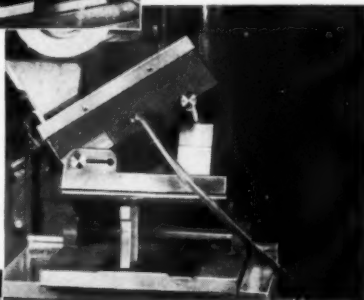


GENERAL  
LIGHT  
MACHINING



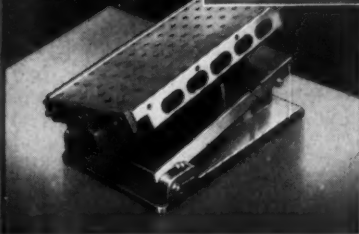
## *The Well-known* **MAGNA-SINE**

Long time favorite of tool-makers all over the world. Determines angles positively with gage blocks like UNIV-ANGLE. Both single and compound angle models available.



## *The new* **UNIV-ANGLE**

The most versatile angular holding device to be had. For both single and compound angles. No dials, no scales. Available in both magnetic and non-magnetic models.



## *The Robbins* **SINE PLATE**

Similar to Magna-Sine except top plate is non-magnetic. Saves time on inspection, jig boring, etc.



**Robbins ENGINEERING COMPANY**

318 MIDLAND AVE.

DETROIT 8, MICHIGAN

November, 1946

MACHINE TOOL BLUE BOOK

35

# PERFECT HOLES

- A NEW INVENTION!
- A NEW MACHINING METHOD! —  
**ROTARY BROACHING\***

- A NEW NAME —

## **"ROTARY BROACH"\***



ROTARY BROACHES may be used in lathes, turret lathes, automatics, drill presses, etc., to replace reamers. They produce perfect holes with finishes that can only be compared to honing. They last longer before grinding is necessary and may be resharpened 10 to 30 times. They produce perfect holes at a fraction of the cost of those produced by other methods. Eliminates grinding, lapping, honing and boring.

**USE THIS NEW MACHINING METHOD —  
ROTARY BROACHING\***

**YOU CANNOT AFFORD NOT TO USE  
ROTARY BROACHES**

*(Write for free descriptive literature)*

\*"Rotary Broach" and "Rotary Broaching" are new names coined and copyrighted by Fearless Tool Company.



**FEARLESS TOOL COMPANY**

1234 S. GRAMERCY PLACE,

DEPT. B-2

LOS ANGELES 6, CALIFORNIA

**DISTRIBUTORS WANTED**



**ASK** AMERICA'S  
LARGEST SCREW MANUFACTURERS  
ABOUT . . .



## **CIRCLE®**

### **SCREW SLOTTING SAWS**

Most of America's large screw manufacturers will tell you they SELECT CIRCLE SCREW SLOTTING SAWS because they are almost certain to find the CIRCLE SAW made for their machine and for their screw slotting work.

Made of High Speed Steel CIRCLE SCREW SLOTTING SAWS are available as follows:

- 1 3/4" Di. — 90 Teeth
- 2 1/4" Di. — 60 Teeth
- 2 3/4" Di. — 72-56-44 and 36 Teeth

Order from CIRCLE R's complete and varied stock of screw slotting saws.

Ask for catalog L for detailed information on all CIRCLE Saws.



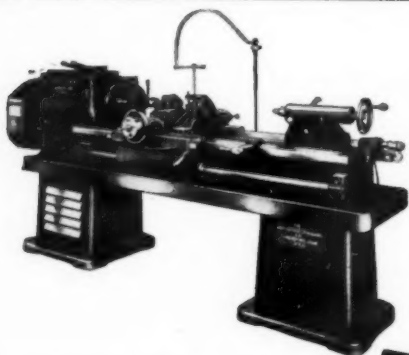
# **CIRCULAR TOOL CO., Inc.**

PROVIDENCE 5, R. I.

Chicago • Philadelphia • New York • Dayton • Cleveland  
Detroit • St. Louis • Minneapolis • Los Angeles  
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# 40 YEARS of EXPERIENCE

*produced*  
the new **COULTER**  
**AUTOMATIC THREADING LATHE**



The many different and number of threading tools which can be arranged on the tool slides both front and rear, make this machine the most versatile of any for production of square, standard, and 29 degree threads, both internal and external.

Equipped with disc clutch . . . Easy to operate . . . Rigid Construction . . . Four speed headstock . . . Return or Idle travel speed has been increased five times cutting speed.

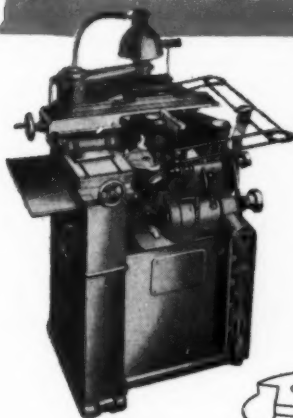
PRODUCTION MACHINES  
SINCE 1896

Write for full particulars

*The James* **COULTER** *Machine Co.*  
BRIDGEPORT • CONNECTICUT • U.S.A.

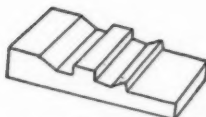
# Fast

## PROFILE GRINDING



WITHIN LIMITS OF

$\pm 0.0002''$



### THE STUDER PROFILE GRINDER

The Studer principle employs a tracer finger which follows the form of a template and transmits its movements to the grinding wheel through a pantograph. The wheel and stylus can be swiveled. Because the wheel is shaped beforehand proportionately to the exact shape of the tracer finger an object can be ground over its entire length in one operation—with one wheel. Because a fixed template is used, errors due to incorrect manipulation are eliminated. A special template holder permits the grinding of circular forms of contours like cams over their entire circumference.

Now you can perform intricate profile grinding at practical high speeds and to exceptional degrees of accuracy! With the Studer Profile Grinding Machine Type PSM you can attain accuracy within  $\pm 0.0002''$  in producing profile gages, straight or circular form tools, sectional dies, complete contours like cams, templates and similar parts of hardened steel. Profiles up to 5.9" in length can be ground from end to end in one continuous operation without moving work-piece or template. Circular work up to 4" in diameter can be ground, and flat pieces—several of which can be stacked for grinding at one time—can be handled up to 2" in thickness. Small sized profiles can be accurately produced without preliminary grinding to form, and clearance angles on parts such as form tools can be ground without removing the work from its original setting.

These are the highlight features of the Studer Profile Grinder. If you can use its exceptional accuracy, its speed and ease of operation, its amazing versatility, write for complete information.

We also represent in the United States these other makers of Swiss High Precision Equipment: Societe Genevoise d'Instruments de Physique (SIP), Andre Bechler, Mikron, Safag, Sallaz, Schaublein, Lienhard. Our engineers will be glad to work with you in specifying and using equipment for the highest precision machining.

HIGH PRECISION MACHINE TOOLS

AND MEASURING INSTRUMENTS

**C O S A**  
CORPORATION



CHRYSLER BUILDING  
New York 17, New York

## "Air Devices by Redmer"



RC-5



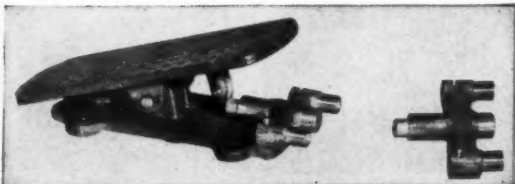
### Index Chuck with Air Operated Collet

Eliminates removing chuck from base of machine for changing index position. Index screw posts located on OUTSIDE of chuck. Provides positive alignment and depth control by using stationary type collets. Capacity 1/16" to 2".



### Air Foot Control and Valve

Designed to make its operation as tireless as possible. Opening and closing of plunger of valve on foot pedal is operated by a roller on pedal casting which relieves wear on plunger and facilitates operation. Valve is a brass casting which will take plenty of abuse and can be removed from the foot control and used as a separate unit in connection with cam operations.



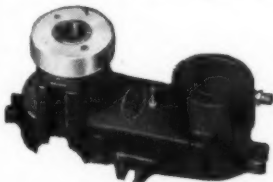
No. FC-28

V-29



### Collet Air Chuck

An air operated collet holding fixture using same type collets as Brown & Sharpe automatic screw machines. For drilling, milling, threading, etc., also for assembly work. Six models, No. 00, No. 10, No. 0, No. 2, No. 2 Special, No. 4, Collet Capacity 1/16" to 3 1/2".



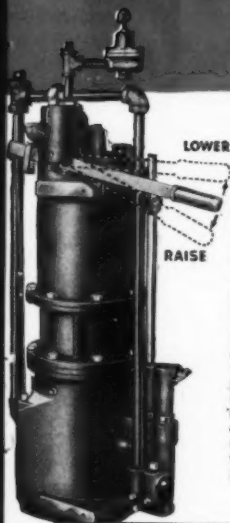
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**REDMER AIR DEVICES CORP.**  
608 W. WASHINGTON BLVD., CHICAGO 6, ILL.

# Now...Modernize

## YOUR KRW ARBOR PRESSES

... FOR HIGH PRODUCTION WITH EITHER  
AIR-OIL OR MOTOR-DRIVEN POWER UNITS



● Thousands of standard KRW Hydraulic Arbor Presses can now be power equipped for production use by adding the new KRW Power Units. These units... either air-oil or motor-driven... are available for 25, 50, 60 and 75-ton KRW standard presses. When power equipped, and utilizing simple, inexpensive dies, these standard presses are adaptable to a great many bending, forming, stamping and straightening operations... relieving heavier and more expensive equipment for other work. Either type power unit is easily attached to the press. Adding the unit in no wise affects the famous KRW two-speed hand pumping feature... press can still be hand-operated. Study the specification table shown here in terms of your work-pressure and motor needs. Give us the serial number of your KRW press and electric current requirements and we will quote you price and quick-delivery date. Put your idle or infrequently used KRW hand-operated Arbor Presses to work where they will pay big dividends... on your production line.

**THIS IS THE NEW KRW  
AIR-OIL DRIVE THAT FITS  
STANDARD KRW  
HAND OPERATED PRESSES**

**THIS IS THE NEW  
KRW MOTOR-DRIVE  
THAT FITS  
KRW HAND OPERATED  
PRESSES**

### AVAILABLE TONNAGE PRESSURES 25-50-60 TON PRESSES

AIR PRESSURE	2" AIR CYLINDER	3" AIR CYLINDER	2" AIR CYLINDER	3" AIR CYLINDER
100 TO 200 POUNDS	2" Oil Cylinder 10 to 22 Tons	1 1/2" Oil Cylinder 14 to 29 Tons	2" Oil Cylinder 17 to 35 Tons	1 1/2" Oil Cylinder 23 to 47 Tons

### 75 TON PRESS

AIR PRESSURE	2" AIR CYLINDER	3" AIR CYLINDER
100 TO 200 POUNDS	2" Oil Cylinder 25 to 51 Tons	1 1/2" Oil Cylinder 33 to 68 Tons

**KRW Motor Drive develops up to Full Capacity  
of any KRW Hand-Operated Press.**



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CATALOG... IT WILL  
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13

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☐ KRW Motor-Drive Power Units

Serial number of our KRW Press is.....

Voltage.....Cycle.....Phase.....

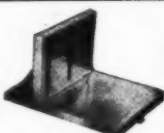
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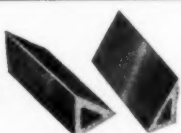
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## TOOLS for PRECISION PRODUCTION

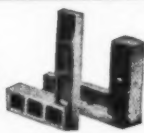
MEEHANITE is an engineering material with strength properties that place it in competition with other strong metals . . . plus, the many good properties of a good gray iron.



Masterangle Plates



Angle Attachments



Try Squares

## MEEHANITE METAL

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with MOVABLE INSERTED CUTTERS

Made in 50 Standard Sizes from 9/16" to 3 1/2" diameter. Features include—easy removal of cutter for sharpening, cutting edge of cutter always in same location, cutter locks securely, pilot drilled and tapped to hold different size bushings, etc.

PROMPT DELIVERY

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**P**  
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TOOLS

# ACME TOOL COMPANY

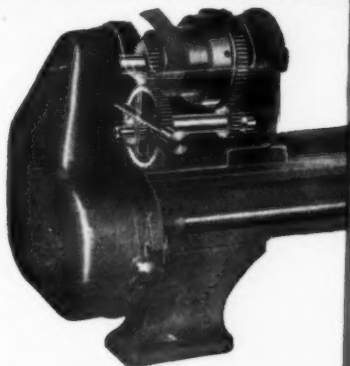
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• NEW YORK 7, N. Y.

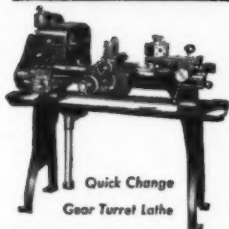
**Logan** A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES



Finger Tip Control for Safety,  
Ease and Speed in Shifting  
Back Gears



### BACK GEARS ENCLOSED IN HEADSTOCK



Quick Change  
Gear Turret Lathe

**SPECIFICATIONS COMMON TO ALL LOGAN LATHES** . . . swing over bed, 10½" . . . bed length, 43½" . . . size of hole through spindle, 25/32" . . . spindle nose diameter and threads per inch, 1½"—8 . . . 12 spindle speeds, 30 to 1450 rpm . . . motor, ½ hp, 1750 rpm . . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision ground ways, 2 V-ways, and 2 flat ways.

### PLUS PATENTED SHIFTER RACK INCREASES SAFETY AND EFFICIENCY, ADDS TO APPEARANCE OF LOGAN LATHES

Logan advanced design encloses back gears in the headstock and places the Patented Shifter Rack which controls these gears on the front side of the headstock, at the operator's finger tips. There is no need to reach over the headstock, or to lean forward close to moving parts to shift the back gears. The operator avoids risk and makes the shift more easily and quickly. Here is another example of the practical designing which makes Logan Lathes outstanding in accuracy, speed, durability and safety, and in trim, clean cut appearance. For full information, see your Logan Lathe dealer, or write direct for the Logan catalog.

L-2

**LOGAN ENGINEERING CO.** CHICAGO 30, ILLINOIS



**FIRST CHOICE  
FOR FINE  
DRILL PRESSES**

"IF IT'S A JACOBS, IT HOLDS"

*Jacobs*



**WITHOUT EXCEPTION  
ALL THE FAMOUS MAKERS  
OF DRILL PRESSES EQUIP WITH**  
*Jacobs Chucks*

To make certain that the accuracy built into their drill presses shall not be lost through inaccurate chucks, the manufacturers of drill presses equip them with Jacobs Chucks—the standard of the world for accuracy and all-round dependability. The superior performance of Jacobs Chucks is recognized by manufacturer and user alike. Among their features are:

Nickel alloy steels for strength and toughness—Areas subject to wear carefully surface hardened—The hardened and ground body has diamond-bored taper hole for great accuracy—Lands are heat treated for extreme hardness with adequate core strength retained—Modern easy-grip sleeves are ground simultaneously on three dimensions for absolute balance—Tools may be readily changed and are always accurately centered with a sure grip—Minute tolerances permit ready interchangeability of parts.

There's no premium on these advantages—advantages that earn their way in shop or product—because Jacobs Chucks are always reasonably priced.



**Jacobs Plain Bearing Key Chuck**

*Chucks*

THE JACOBS MANUFACTURING COMPANY  
Hartford, Connecticut



## PRECISION MANUFACTURING

For 46 YEARS is  
Your Assurance

*"It's Proven!"*

The "Know How" experience gained over this long period is built into every REID PRECISION SURFACE GRINDER.

### BECAUSE OF

DEPENDABLE ACCURACY,  
ECONOMICAL PRODUCTION,  
CONTROLS AT YOUR FINGERTIPS,

LEADING SHOP MEN EVERYWHERE SAY,  
"for Close Tolerance, use a Reid!"

ILLUSTRATED IS THE REID  
MODEL 2-B ALL-ELECTRIC POWER FEED.

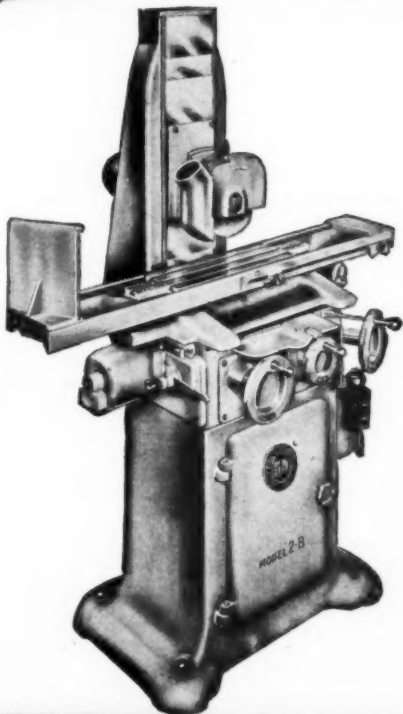
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IS AN EXCEPTIONAL MACHINE FOR TOOL,  
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GRINDING.

MACHINES EQUIPPED FOR WET GRINDING  
IF REQUIRED.

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DISTRIBUTORS CONVENIENTLY  
LOCATED IN ALL SECTIONS

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Illustrated Bulletin and Prices*



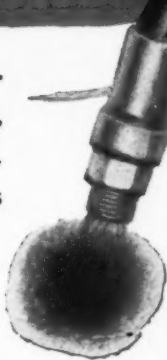
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BEVERLY MASSACHUSETTS

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CLEAN, DRY AIR boosts performance of air-driven tools, cylinders, valves and chucks. Reduces maintenance. Saves early replacement.

## Install A Norgren Filter!

A double Monel wire screen stops rust, dust and pipe scale. Baffle action catches moisture and oil emulsion. Muck falls to the bottom of bowl, open waste cock, blow it out. Compact. Leakproof. Dependable.



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**FILTERS**

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**NEU-T-ROL**  
Magnetic  
Chuck  
Controls

**DO  
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MAGNETIC  
CHUCKS?**



If so, you need these modern aids for maximum chuck performance.

NEU-T-ROL Magnetic Chuck Controls speedily release and demagnetize workpieces. With NEU-T-ROL, there's no need to hammer or pry to release the work. This saves time and tempers — saves marred, distorted workpieces and prevents damaging of chuck faces. NEU-T-ROL also protects chucks against harmful voltage surges.

ELECTRO-MATIC Rectifiers are sturdy, heavy duty d-c current supply units, engineered to "stand up" day-after-day in the hardest service. They are available in 42 models in capacities ranging from 125 to 3000 watts.



NEU-T-ROL and ELECTRO-MATIC Rectifiers can be installed easily on equipment already in use — or built into new machines before delivery if you so specify.

*Let us send bulletins giving full information—no obligation.*

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**ELECTRO-MATIC**  
Industrial  
Rectifiers

# HYDRATROL LATHES

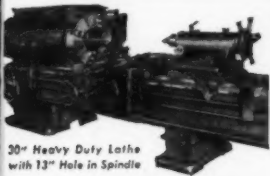
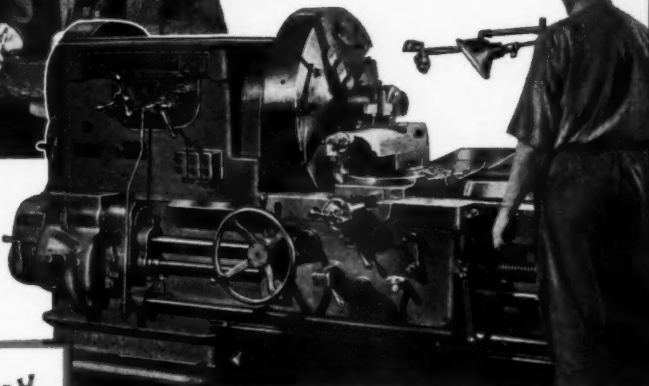
... ENGINEERED

To Increase Production!

To Improve Work!



Heavy Duty HYDRATROL Lathes, Sizes 20" to 36". The 36" size, shown at right, has all the ruggedness and power for the heaviest possible work.



30" Heavy Duty Lathe with 13" Hole in Spindle

## LARGE HOLLOW SPINDLE TYPE 5 SIZES—18" to 36"

Small . . . 18" up to 7 1/4" Hole  
Medium . . . 24" up to 12 1/2" Hole  
Large . . . 27" up to 13 1/2" Hole  
Large . . . 30" up to 14 1/2" Hole  
Large . . . 36" up to 16 1/2" Hole  
(Standard type lathes, 16" to 36")

## Do It Better - on a HYDRATROL!

**I**N hundreds of plants — under all sorts of conditions — LEHMANN HYDRATROL LATHES have invariably brought about faster production, better work, lower costs.

Look around your own shop — you may find a number of machining jobs which possibly could be done better on a Heavy Duty Type of HYDRATROL LATHE, as pictured above. Send us prints of these unusual, difficult, or too-costly machining jobs, for a specific, time-and-money-saving recommendation.

MOVIE SOUND FILM, in natural colors, available, showing functions of Hydratrol Lathe, advanced construction features, and production machines in operation. Ask the Lehmann representative for a showing.

# Lehmann MACHINE COMPANY

CHOUTEAU AT GRAND . . . ST. LOUIS 3, MISSOURI

# MOTOR TOOL *LIVE* CENTER

WILL *Outlast* A BASKETFUL  
OF *Ordinary Centers*

## *Here's Why!*

You no longer have to guess whether you are overloading MOTOR TOOL *Live Centers*. When the load is too great a RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs.

This is an exclusive feature, developed by MOTOR TOOL, that cuts MOTOR TOOL *Live Centers* repairs to practically nothing—immeasurably INCREASES their life—and puts an end to burnouts, breakdowns and work spoilage.

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Descriptive  
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**MOTOR TOOL MANUFACTURING CO.**  
**METAL CUTTING TOOLS**

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*Make it a Rule  
to Call Motor Tool*

# The *Air Valve* You Have Been Looking For

## PILOT OPERATED • SOLENOID CONTROLLED

### A New ROSS Piston Poppet Type Valve

#### ✓ FAST OPERATING

as high as 400 cycles per minute.

#### ✓ LARGE ORIFICE AREA

results in fast exhaust, minimum restriction to air flow.

#### ✓ POSITIVE SEAL

by line pressure.

#### ✓ SIMPLICITY OF DESIGN

removing end plugs permits replacement of piston poppet assembly—no need to disturb piping or to move valve from position—no "down time".

#### ✓ ECONOMICAL TO OPERATE

current consumption 1.2 amps. at 110 volts—60 cycle.

#### ✓ LONG SERVICE ASSURED

many Ross valves installed more than 20 years ago are still in active service.

#### ✓ SMALL AND COMPACT

appreciated where space is limited.

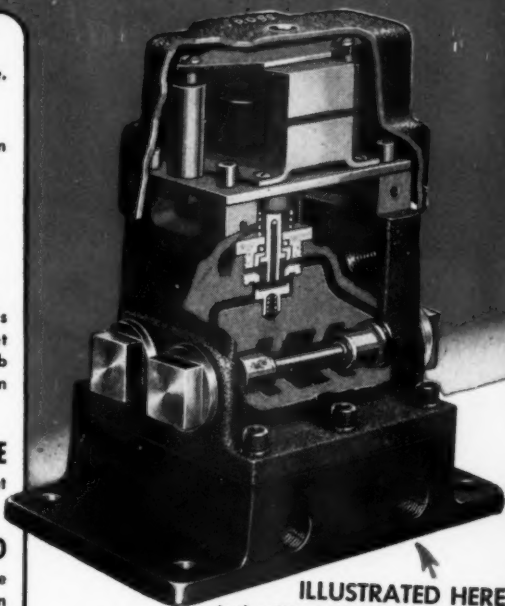
#### ✓ ALL PARTS

non-corrosive metals.

#### ✓ ACCURATELY MACHINED

and all parts interchangeable.

A TYPE AND SIZE  
FOR EVERY PURPOSE  
\*  
OVER 100 DIFFERENT MODELS



ILLUSTRATED HERE  
is the FOUR-WAY— $\frac{3}{8}$ " Capacity

*Available in:-*

#### ● THREE-WAY

normally open, or normally closed

#### ● FOUR-WAY and

● FOUR-WAY, Five port.  
may be had in  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ " and  $\frac{3}{4}$ " pipe size

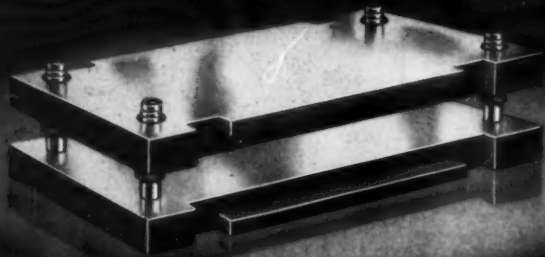
**ROSS**  
*Air Control*  
**VALVES**

**ROSS Operating VALVE CO.**

6480 Epworth Blvd. Detroit 10, Mich.

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2895 W. GRAND BLVD. • DETROIT 2, MICH.

**DETROIT  
DIE SETS ★**

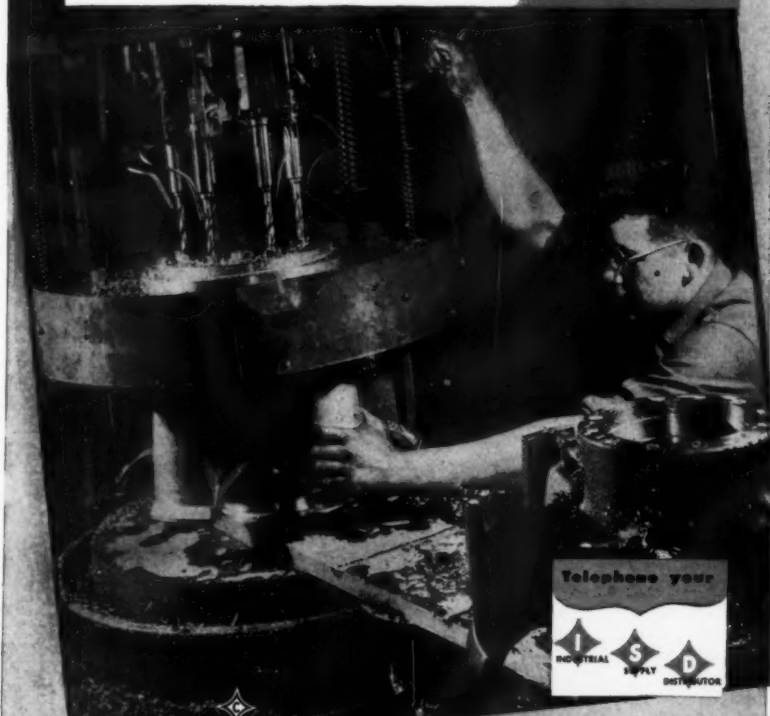


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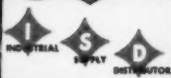
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MORE HOLES  
PER GRIND**



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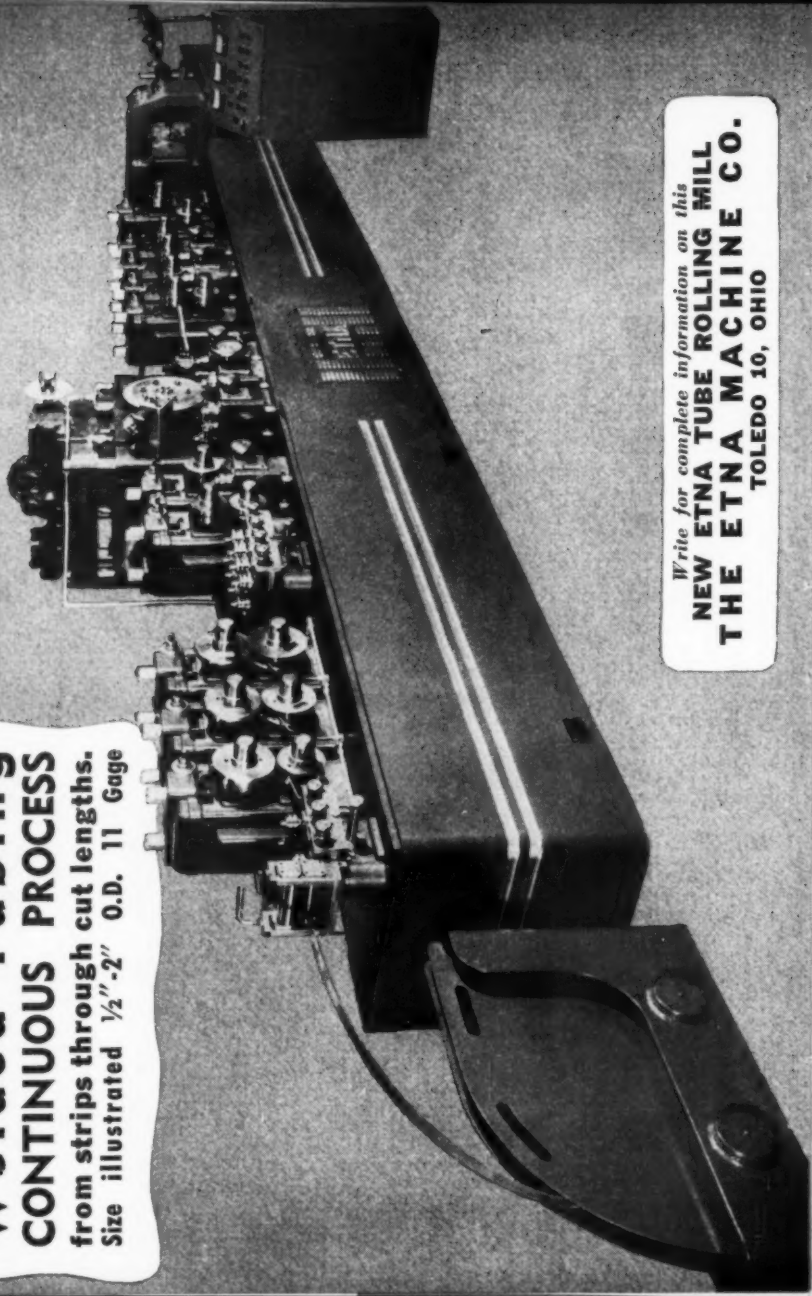
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**CONTINUOUS PROCESS**  
from strips through cut lengths.  
Size illustrated  $\frac{1}{2}$ "-2" O.D. 11 Gage

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**NEW ETNA TUBE ROLLING MILL**  
**THE ETNA MACHINE CO.**  
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**Rockers are all right!**

but when your tool posts  
begin to rock...it's time  
to switch to the

**HOWARD**

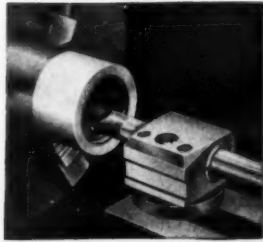
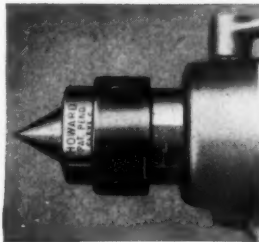
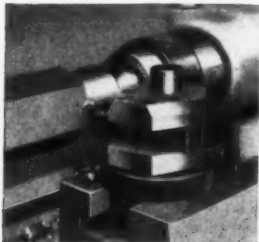
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**HOWARD TOOL HOLDERS**

• Height adjustment ring • Rigidity—accuracy—versatility • All sizes and models for bench lathes to roll lathes



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**HOWARD COMBINATION HOLDERS**

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3370 West 140th Street, Cleveland 11, Ohio

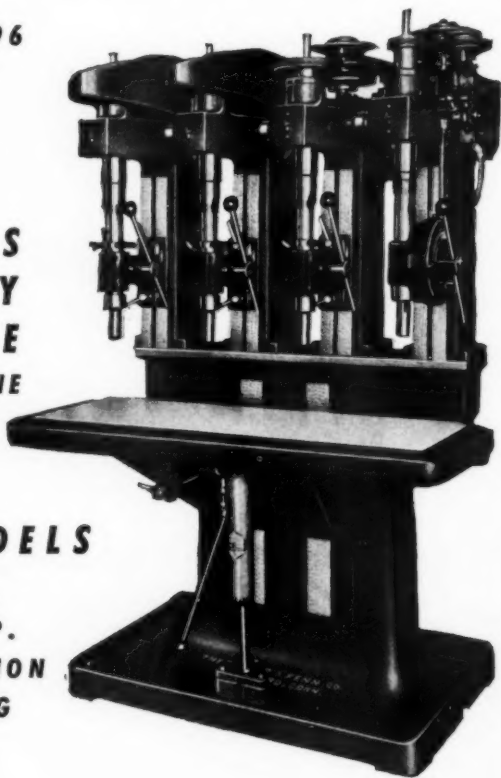
# THE DRILL WITH A HUNDRED AND ONE SPEEDS

4 SPINDLE M96  
RIGHT HAND  
SPINDLE  
POWER FEED

ALL SPEEDS  
INSTANTLY  
AVAILABLE  
WHILE MACHINE  
IS RUNNING

## TWO MODELS

M96— $\frac{7}{8}$  CAP.  
M125— $\frac{3}{8}$  CAP.  
BOTH PRECISION  
BALL BEARING

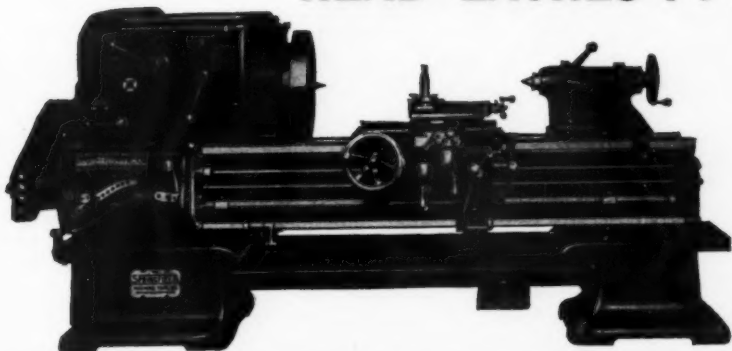


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**THE TAYLOR & FENN CO.** HARTFORD 1, CONN.

# Springfield

## HEAVY DUTY GEAR HEAD LATHES . . .



TOOL ROOM LATHES are equipped with Lead Screw Reversing Mechanism, producing right and left hand threads and feeds controlled by lever at right hand side of Apron, with automatic stops for both Lead Screw and Feed Rod. Oil Pan is also included as regular equipment.

Extreme accuracy and long life are maintained in SPRINGFIELD LATHES by the deep, well ribbed bed made from High Test Nickel Chrome Gray Iron. These beds are made in our own Foundry and, after exhaustive metallurgical and wear tests by professional laboratories, and practical tests in the field, this material has proven itself to be the best for use in lathe beds. It gives greater wear resistance, freedom from scoring, and freedom from internal strains, which factors all result in greater accuracy throughout the life of the lathe.

The direct reading Gear Box is tongued, grooved and bolted to front of bed and is the enclosed type to exclude dirt and chips from gears. Wide gears and heavy shafts are used with Ball and Bronze Bearings throughout. Thirty-six (36) changes of threads and feeds are obtained, and in connection with the Reverse Gear, either right or left hand threads can be produced without the use of wrenches.

SEND TODAY FOR BULLETIN 116

**THE SPRINGFIELD MACHINE TOOL CO.**  
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# The Prutton... TAPMASTER



3  
TAPPING MACHINES IN  
1

Speedy: can do three jobs at once, tapping any size hole up to  $\frac{1}{4}$ ". Three separate motors. Single or continuous cycle. Positive feed by husky lead screw prevents tearing of threads. Safe—no jamming of work. Ample tanks for coolant oil—ready accessibility. Descriptive bulletin.  $\frac{3}{4}$ " awning eye-end and  $\frac{3}{4}$ " pipe cap; 1500 per hour on Tapmaster.

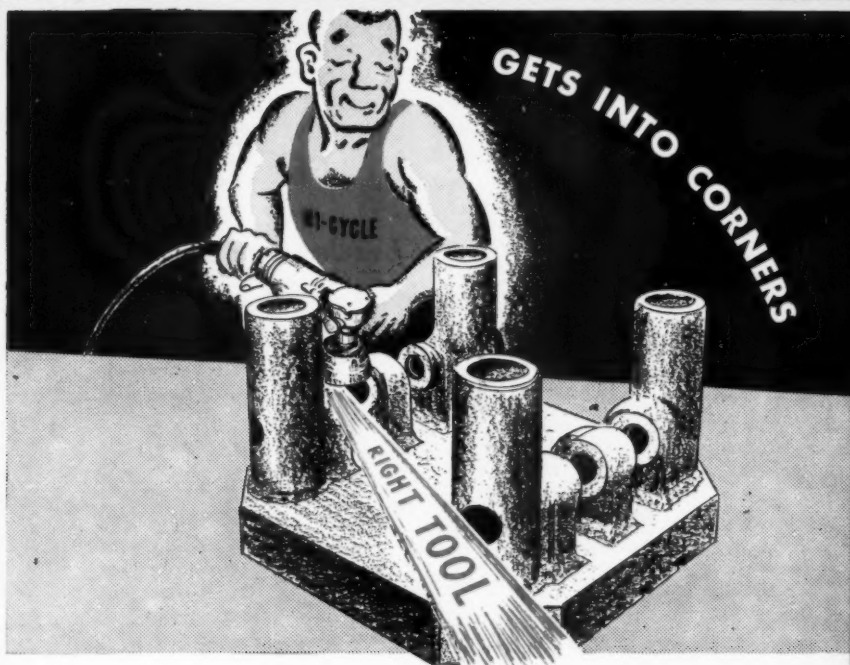
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. . . DESCRIPTIVE BULLETIN

## D. H. PRUTTON MACHINE & TOOL CO.

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CLEVELAND 11, OHIO



## SAVES 50¢ ON THE DOLLAR

This welding shop had been using small air grinders with cone wheels to grind fillet welds in jigs. They called in the Rotor Application Engineer to step up production. In view of the large amount of grinding involved, he suggested a High Cycle installation with Rotor Right Angle Grinders with 6" flared cup wheels properly dressed to reach corner welds. These tools were installed. Results:

**50% decrease in grinding costs due to:**

**100% increase in grinding output due to the**

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**HIGH CYCLE O'TOOL**

AIR

THE **ROTOR TOOL** CO.  
CLEVELAND, OHIO

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# ONE *for* TWO jobs



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LOW-PRICED BENCH MACHINE  
FOR BOTH HORIZONTAL  
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*benchmaster mill with  
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2" center Longitudinal travel  $8\frac{1}{2}$ "—Traverse travel  $5\frac{1}{2}$ "—Vertical travel  $8\frac{1}{2}$ " on vertical mill— $9\frac{1}{2}$ " horizontal mill—Height 28"  
—Weight (less motor) 215 lbs.—Requires  $\frac{1}{3}$  h.p. motor—Spindle speeds (standard 1725 rpm motor) 450-850-1400-2100 rpm.

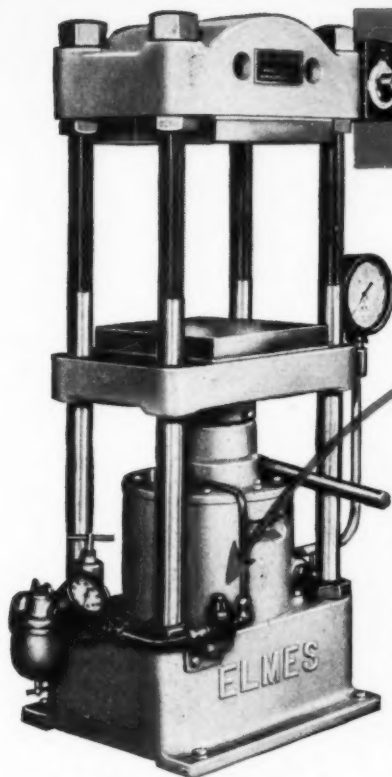
**For complete information write to Dept. MT-9**

***benchmaster***

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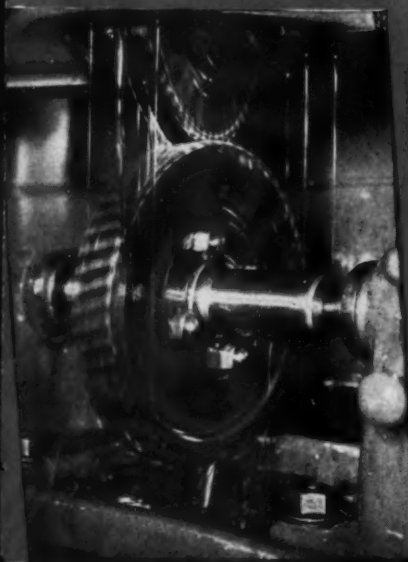
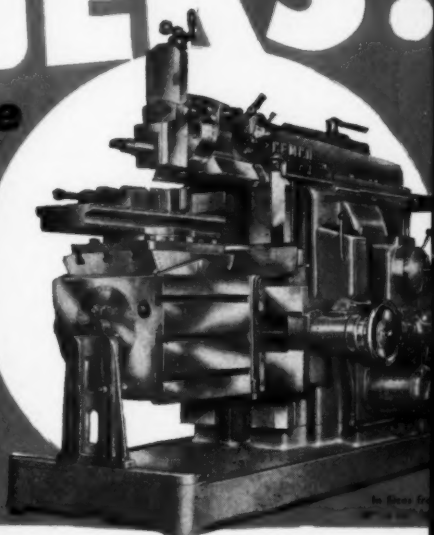
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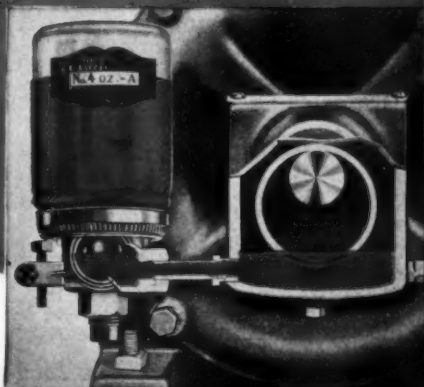
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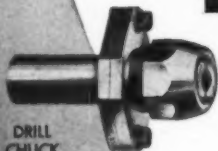
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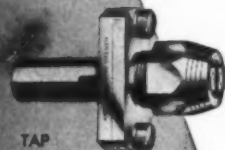
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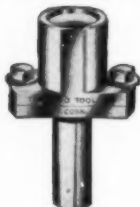
TAP  
HOLDER



ACORN  
DIE  
HOLDER



BUTTON  
DIE  
HOLDER



ROLLER  
STOP



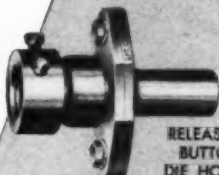
SPRING  
DIE  
HOLDER



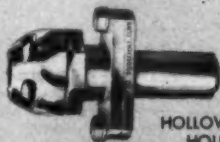
RELEASING  
TAP  
HOLDER



RELEASING  
ACORN  
DIE HOLDER



RELEASING  
BUTTON  
DIE HOLDER

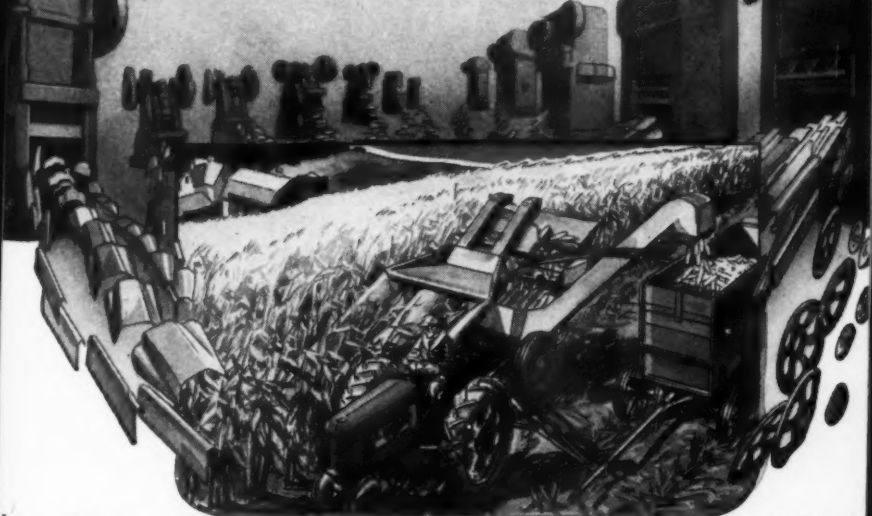


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*Way Down Yonder in the Cornfield*



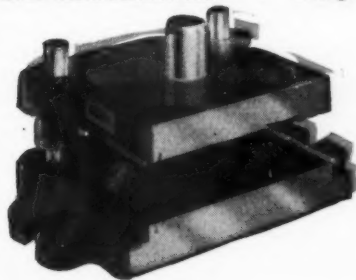
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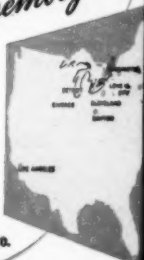
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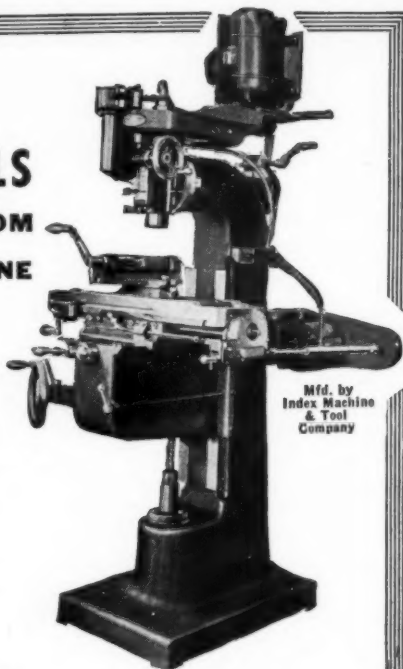
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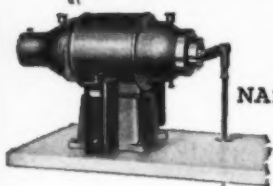
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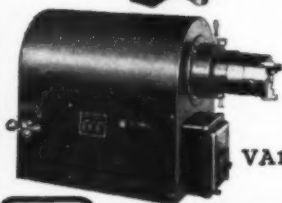
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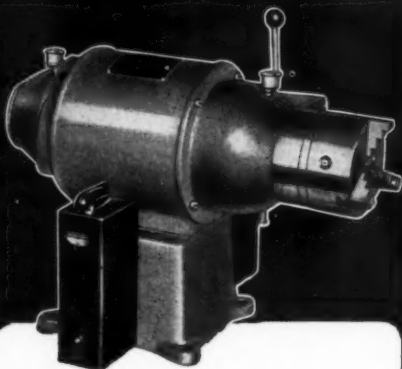
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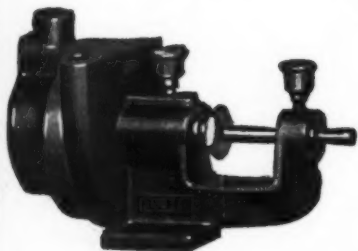
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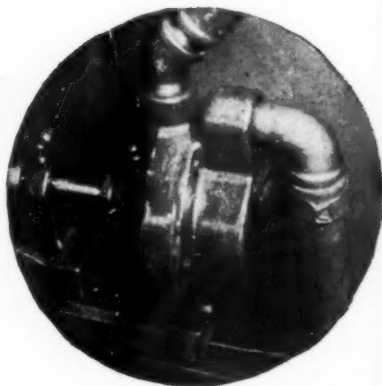
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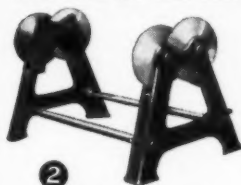
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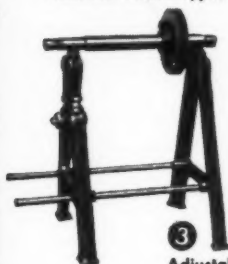
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**1** Checking vee-belt pulleys with Super-Sensitive Bench type — will indicate out-of-balance small as five grains on a 3" radius in work-piece weighing 1 1/2 lbs.

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**MACHINE TOOL COMPANY**

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*Universal*

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**... BECAUSE** one easily adjustable New-Field Fly Cutter performs a variety of production jobs.

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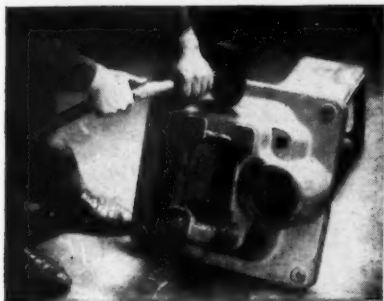
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FLEXIBLE SHAFT EQUIPMENT



**HC-5**  
1/2 H.P. Multi-speed  
countershaft unit,  
900 to 3600 RPM.  
Bench-height pedestal,  
360° motor  
swivel.

# CUSHMAN CHUCKS

*A World Standard  
for Precision*

Here are  
some of  
the reasons  
why !

Pinions of hardened special analysis steel with tooth form precision ground to provide accurate alignment with the scroll gear.

Chuck bodies engineered to assure twisting, stiffness and jaw supports and alignment without excess weight. Mounting faces precision machined.

Counter bore recess of bodies finished to extreme accuracy to guarantee correct alignment when mounted. Pratt & Whitney Electrolimit gages are used for testing these dimensions for Chucks designed for American Standard Type A-1, Cam Lock Type D-1 or Long Taper Key Drive Type E mountings.

Face of master jaws hardened and ground after assembly in chuck to provide accuracy in alignment of special top jaws. Cross key slot finishes providing accurate location of top jaws.

Scrolls of self centering chucks are cut on our own specially designed machines after heat treatment. This method insures precision lead of scroll thread and toughness to withstand chucking stresses.

Accuracy of finished chucks tested and held to within .003" total indicator error. Chuck bodies dynamically and statically balanced.

THE CUSHMAN CHUCK CO., HARTFORD 3, CONN.

## CUSHMAN CHUCKS



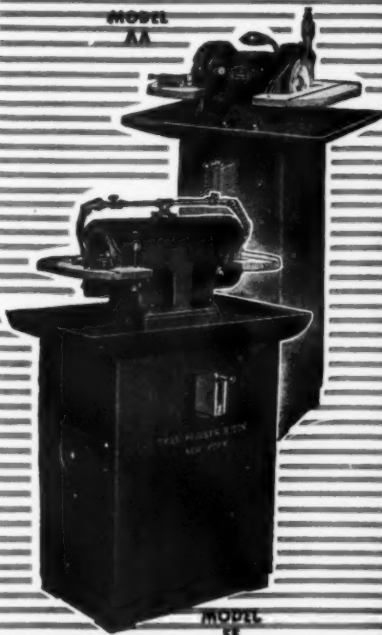
A WORLD STANDARD FOR PRECISION

# PROSSER

## Carbide Grinders



MODEL  
AA



For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, dependable and profitable service.

Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

#### *Important features include:*

- Quick-acting indexing tables.
- Adequate wet-grinding equipment.
- High grade ball bearing spindles.
- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- Moderate price.
- Prompt deliveries.

*Write for details*

*Thomas Prosser & Son*

120 WALL STREET • NEW YORK 3, N. Y.

# NOW *Immediate Delivery!*

## *Thor* WIRE WHEEL BRUSHES

*from Distributors Stocks*

Now you can get immediate delivery of sturdy, long-life Thor wire-wheel brushes in most popular styles and sizes from your nearby Thor Distributor's stock. Constructed to resist crystallization and breakage, these modern brushes will operate efficiently on portable and stationary equipment with spindle speeds up to 6000 R.P.M.

Order now from your nearby Thor distributor.

**INDEPENDENT PNEUMATIC TOOL COMPANY**

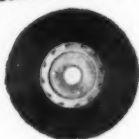
600 W. Jackson Boulevard, Chicago 6, Illinois

BRANCHES IN PRINCIPAL CITIES



**INTERCHANGEABLE  
ARBOR**

Diameter: 4" to 12"  
Arbor Range: 1/4" to 2"  
Wire Gauges, Sizes: 30 to 36



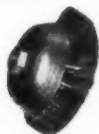
**SECTIONAL TYPE**

4" to 12"  
1/4" to 3 1/4"  
30 to 36



**CUP TYPE  
Plain Arbor**

4" to 6"  
3/8"  
.012" to .030"



**CUP TYPE  
Threaded Arbor**

4" to 6"  
3/8"  
.012" to .030"

# *Thor* PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY  
ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

# 5 Different Types And They're All . . . *Hy-Draulic*

Whatever you may require of your shaper or planer equipment, there's a Rockford Hy-Draulic machine tool to meet your needs. Because Rockford machines are Hy-Draulic they offer many important advantages in easier operation, speed, quality of work, and low overall costs. Rockford Hy-Draulic planers and shapers are built in a wide range of sizes and in five basic types.

**1** RAM-TYPE SHAPERS...available in rated stroke sizes of 12", 16", 20", 24", and 28". A special 24" machine is also built with non-standard table specifications for specialized work.

**2** OPENSIDE SHAPER...built in 36" table stroke size. Provides shaper speeds and rigid mounting for tool.

**3** SLOTTERS...Ram assembly may be set in a tilted plane up to 10° off-vertical. Table provides longitudinal, transverse and rotary feed. Built in 12", 20" and 36" rated stroke sizes.

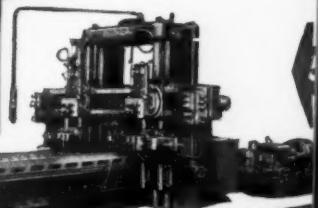
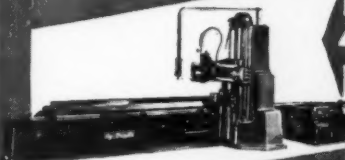
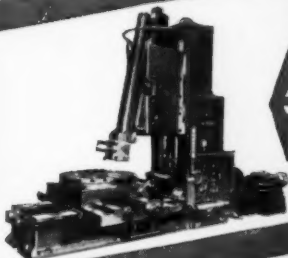
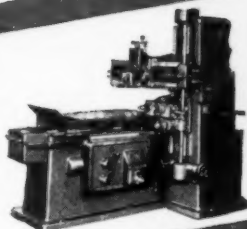
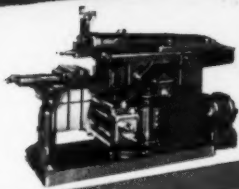
**4** SHAPER-PLANERS...of practical use in a wide range of applications where smaller-type planer work must be done. Built in stroke sizes of 42", 66", 90", 120", and 144".

**5** PLANERS...Double-Housing and Openside... each type built in four rated sizes from 36"x 36" to 60"x60"; maximum stroke lengths of 10, 12, 14, 16, 18, or 20 feet available in each size.

Information on all Rockford Hy-Draulic machine tools will be sent promptly upon request. Write for Catalog 1946... your inquiry is invited.

**ROCKFORD MACHINE TOOL CO.**  
Rockford Illinois

4612

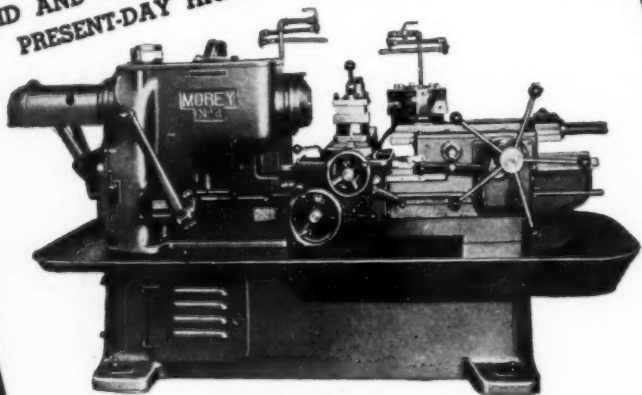


*Hy-Draulic*

# MOREY *Universal* TURRET LATHES

for BAR or CHUCKING

**THE TURRET LATHE *Your Operator* APPROVES!**  
EASY TO OPERATE • ACCURATE • DEPENDABLE  
RIGID AND POWERFUL ENOUGH TO FULLY UTILIZE  
PRESENT-DAY HIGHSPEED CARBIDE TOOLS



## #4 UNIVERSAL

For bar stock up to 2" in diameter  
12" turning length, 19½" swing over bed  
Infinite spindle speeds: 35 to 1500 RPM,  
constant speed motor, 1200 RPM

MAY BE HAD WITH PLAIN CROSS SLIDE  
No. 3 Universal, 1½" capacity  
No. 2 Plain, 1" capacity

Also available in  
ASK FOR DESCRIPTIVE BULLETIN

STOCK DELIVERY

DESIGNED AND BUILT BY

**MOREY MACHINERY CO., INC**

410 FIFTH STREET, NEW YORK 13, N. Y.  
PLANT: 407 211 E. ST. RIA 2, NEW YORK



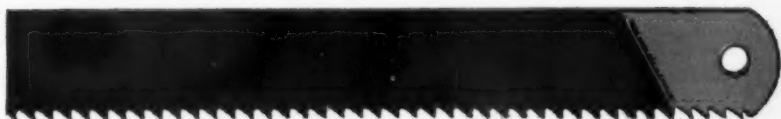
# Get SIMONDS



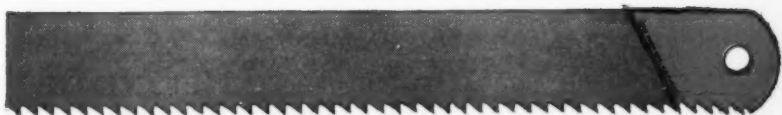
**"RED END" HACKSAW BLADES**



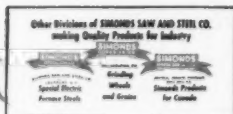
**... AND GET A LONGER RUN**



**FOR YOUR MONEY**



SEE SIMONDS SOUND-FILM, in color, showing how to get the best results and longest service out of the finest blades made... SIMONDS "Red End" Blades for Hand and Power Hacksawing. You can arrange with your Industrial Supply Distributor for a showing of this interesting movie. Or write to the nearest Simonds office.



# Wickman BRINGS YOU *New Efficiency* in SHARPENING CARBIDE TOOLS

Wickman-Neven Bench Grinder has special 1 h.p. motor, giving ample power for full use of diamond wheel. Permits unlimited frequency of spindle reversal.

Wickman-Neven STEEL-BONDED Diamond Wheel is practically indestructible; can't be damaged even by plunging sharp-pointed carbide tool into it.

Coolant pump provided, with reservoir in base of machine.

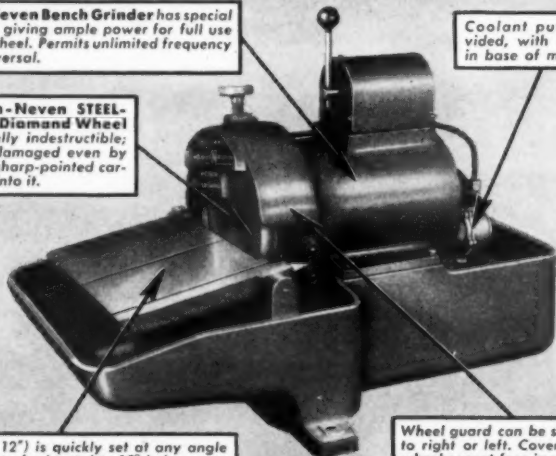


Table (8" x 12") is quickly set at any angle from 5° above horizontal to 15° below.

Wheel guard can be swiveled to right or left. Covers entire wheel except face in use.

## THIS ENTIRELY NEW COMBINATION—

(1) the extra-durable Wickman-Neven STEEL-BONDED diamond wheel, and  
(2) the compact, powerful Wickman-Neven Bench Grinding and Lapping Machine—provides unequalled speed, safety and economy in off-hand grinding all single-point carbide tools. Check the features outlined above, and consider the practical benefits they'll bring to YOUR shop or tool-room.

Complete specifications on request.

### Immediate Delivery!

Grinding machine complete with Wickman-Neven steel-bonded plain cup diamond wheel, 6" diam. x 1 1/4" hole x 3/8" rim . . . \$395.00  
Wickman-Neven replacement wheel . . . \$157.00  
Net to User

DEALERS: Some territories are still open in the U. S. We invite your inquiries.

**THE Wickman CORPORATION**

15533 WOODROW WILSON AVE.  
DETROIT 3 • MICHIGAN

A. C. WICKMAN (CANADA), LTD., P. O. BOX 9, STATION N, TORONTO, ONTARIO

For greater  
accuracy, speed  
and economy  
in your  
thread cutting

## MODERN STATIONARY TYPE SELF-OPENING DIE HEADS

Modern Self-Opening Die Heads thread diameters from  $\frac{1}{8}$ " to 7" in standard heads, and up to 14" in special heads . . . accurately, fast, and economically. They are adapted to practically every thread cutting operation within their capacity. Designed for use in hand screw machines, turret lathes, and other machines where the die heads are used in a stationary position.

**PROMPT SHIPMENT....USUALLY FROM STOCK**



- Wider threading range with greater flexibility. Unusually well suited to general purpose diversified threading work.
- Soundly designed and carefully built to insure maximum productiveness combined with long lasting, accurate service.
- Made with the least number of parts. Hardened and ground throughout. Wear is held to a minimum.
- Simplified design makes chaser change quick and easy. No special tools required.

# MODERN TOOL WORKS

DIVISION OF

CONSOLIDATED MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK



*Precision Tapping  
Boosts Production  
and Lowers Costs*

REG. U.S. PAT. OFF.  
**HY-PRO**  
**TAPS**

Before you place another order for taps, consider this authenticated fact—when tapping at high speeds a ground thread tap will usually produce at least six times as many holes as a cut thread tap!

In addition, it requires less power, and all conditions being equal, the ground thread tap requires about one-fifth the sharpening for the same number of tapped holes, and is less easily broken!

Specify HY-PRO Ground Thread Taps to effect economies in your tapping operations — to obtain precision in every threaded part.

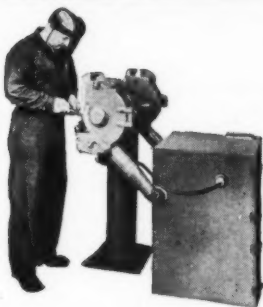
**PROMPT DELIVERY.** Many special as well as standard taps in stock.

**COMMERCIAL, PRECISION  
SPECIAL  
GROUND THREAD TAPS**

*Send for Catalog on Company Letterhead*

**HY-PRO TOOL CO.**

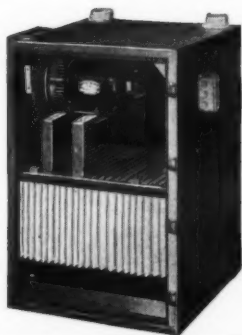
New Bedford, Mass., U.S.A.



Don't let your drive for high level production get lost in clouds of abrasive dust. Eliminate this menace with —

**TORIT**

## DUST COLLECTORS



Self-contained and portable, TORIT Dust Collectors are attached right at the machine. There are no pipe lines and the cleaned air is recirculated back into the room. Temperatures are maintained and men's health protected.

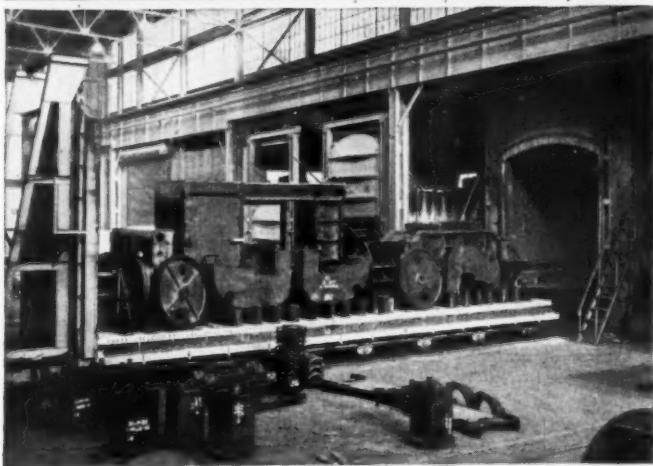
TORIT Dust Collectors range in size from  $\frac{1}{2}$  HP to 3 HP, with models designed for every standard dust cleaning job. For complete information and the latest TORIT catalog write:

**TORIT MANUFACTURING CO.**  
303 Walnut Street St. Paul 2, Minn.

**Warco**  
PRESSES

## WELDED STEEL PRESSES

(FULLY STRESS RELIEVED)



### "Baking" Strength into the Unity of Metals

The inherent stiffness of steel plates is 21/3 times that of gray iron castings and 11/2 times that of Meehanite or high test castings. . . . Warco press engineers have capitalized on this advantage in building the advanced line of Warco welded steel presses.

All welded parts are "baked" at 1150 degrees F. for a pre-determined period of

time in custom built annealing furnaces, to give additional strength to the perfect union of metals in the weldments.

This stress-relieving of weldments, though a routine step in fabrication of Warco presses, is vitally important—it virtually eliminates locked up stresses.

We are in position to give prompt delivery on most standard models.

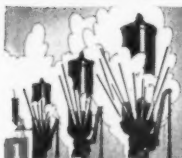
#### THE WARREN CITY MANUFACTURING COMPANY

1948 Griswold Street, Warren, Ohio

A subsidiary of the Federal Machine & Welder Company • Offices in Principal Cities

ECCENTRIC GEAR PRESSES • OBI PRESSES • HYDRAULIC PRESSES • MECHANICAL PRESS BRAKES  
HORN PRESSES • DOUBLE CRANK PRESSES

# Holy Smokes! They've done it again!



**1** Blow all the whistles! They've done it again!



**2** Blast out a fanfare for a great new Woodworth invention!



**3** It's the WOODWORTH ADJUSTABLE Thread Ring Gage.



**4** Thread ring gages check the outside dimensions of threaded parts.



**5** Adjusting 'em as they wear down saves time and money.



**6** But old types get pear-shaped—lose accuracy—wear out fast.



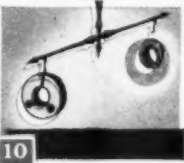
**7** Woodworth's New Thread Ring Gage adjusts perfectly—STAYS ROUND.



**8** Never gets out of alignment when dropped or thrown about.



**9** Wears 1 1/2 to 5 times longer—With equal distribution of wear.



**10** Light weight reduces operator fatigue—increases sensitivity.



**11** It's amazingly accurate... Ideal for hair-splitting work.



**12** Woodworth's New Thread Ring Gage is an all-time champion!

## Another Woodworth Contribution to Production

THE NEW Adjustable Thread Ring Gage, another revolutionary Woodworth instrument of accuracy, is now available to industry!

Employing an entirely new principle of design, and proven mathematically correct by actual tests, this gage assures roundness through the maximum range of adjustment.

### Check these Five Important Advantages

- 1. Greater Accuracy and Stability.** Stays round with adjustment. Threads held in alignment of thread helix angle with adjustment. Will not reject parts that should pass inspection.
- 2. Longer Wear Life.** Equal distribution of wear over the full thread circumference, through the entire range of adjustment, increases wear life 2 1/2 to 5 times.
- 3. Less Weight.** Aluminum alloy outer body halves the weight to greatly reduce operator fatigue and increase sensitivity.
- 4. Positive Identification.** Green outer body for GO GAGE and red for NOT GO GAGE saves time for operator.
- 5. Positive Adjustment.** Cannot be thrown out of adjustment by ordinary blows or falls that change setting of conventional gages.

You can speed up production and decrease gaging costs on your thread inspection operations with this amazing instrument! Write for completely illustrated folder 46-R.

ACCURACY YOU CAN TRUST

## WOODWORTH

W. A. WOODWORTH CO., SALES DIVISION

1300 E. NINE MILE ROAD

DETROIT 20, MICHIGAN

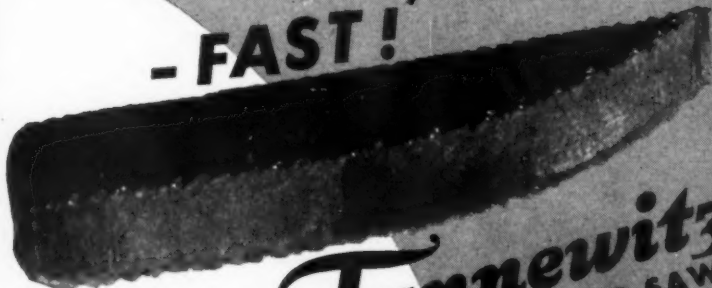
PRECISION GAGES

PRECISION MACHINED PARTS

DIAPHRAGM CHUCKS—SPECIAL TOOL

ADJUSTABLE CLAMPING JIGS

for Sawing METAL as HARD as a FILE  
or Trimming FORMED PARTS  
**- FAST!**

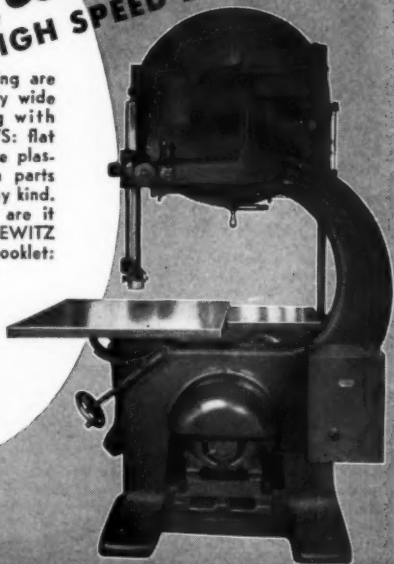


Actual photo of file  
friction sawn on  
Tannewitz High  
Speed Band Saw.

# Tannewitz

HIGH SPEED BAND SAWS

Cost reductions that are downright amazing are effected in the cutting of an extremely wide variety of materials by friction sawing with TANNEWITZ HIGH SPEED BAND SAWS: flat sheets, hardened or soft steels, armor plate plastics, and many others. Formed aluminum parts can be trimmed without using a rest of any kind. Whatever your cutting problem, chances are it can be done faster and better with TANNEWITZ HIGH SPEED BAND SAWS. Write for booklet: "FRICTION SAWING."



**THE TANNEWITZ WORKS**  
GRAND RAPIDS 4, MICHIGAN



# THE CONE AUTOMATIC MACHINE COMPANY



... sees many ...

## GOOD THINGS AHEAD

### It is reported that . . . . .

The Army and Navy are studying our natural caves, such as Carlsbad and Mammoth, in order to determine their usefulness as war-time shelters for industry.

get ready with CONE for tomorrow

Weirton Steel Co. now pipes oxygen around its plant like water.

get ready with CONE for tomorrow

Centrifugal casting of plastics is claimed by Resolin Co. of Beverly Hills to offer the same advantages that the process does to the casting of metal.

get ready with CONE for tomorrow

Dow Corning has tested paints made from silicone resins and aluminum powder on diesel manifolds and furnace doors at temperatures as high as 600 degrees Fahrenheit.

get ready with CONE for tomorrow

A joint committee of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers has standardized the sizes of large steam turbines and the first standard unit for electric power generation is now under construction.

get ready with CONE for tomorrow

Federal Telephone and Radio Corp. claim that their new small-size selenium rectifier can replace as many as 29 different rectifier-type tubes now used in radio receivers.

get ready with CONE for tomorrow

International Business Machine Corp. is offering the Chinese a typewriter that will print 5,400 ideographs by the use of 43 keys. An experienced user can write about 45 words per minute (English record 149).

get ready with CONE for tomorrow

American Steel and Wire Co. has a quarter-inch nail that can be used to tack tags to cold steel ingots.

Texaco has developed a new synthetic grease for aircraft instruments, controls, cameras and small motors that is usable from 100 degrees below zero to 300 degrees above.

get ready with CONE for tomorrow

Recent tests indicate that the new railroad car stabilizer, developed by Westinghouse from the gyroscopic tank gun mount, shows great improvement in riding comfort over all kinds of roadbeds.

get ready with CONE for tomorrow

Welded tubular chassis, helical springs, independent axles, 1000 pounds less weight and a lower powered engine are among the details of the proposed new low-priced Chevrolet.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

The new Duco Metalli-Chrome automobile lacquer uses particles of aluminum to give a metallic luster and is made in 200 colors.

get ready with CONE for tomorrow

Slight bends in the last threads of a new lock nut made by Grip Nut Co. permit it to turn freely through most of its travel, yet prevent it from loosening when finally set up.

get ready with CONE for tomorrow

United Engineering and Foundry will pour a 243-ton casting for a press base which will take one month to cool and another month to anneal.

get ready with CONE for tomorrow

University of California scientists have produced a standard for the measurement of length ten times as accurate as the cadmium light ray now accepted by using a light wave from transmuted mercury (made from gold) excited by a high frequency radio beam.

## FOUR



in ONE!

Your parts machined in the time for one to profitable production.

The set screw blanks shown are made from SAE-3125 bar stock within the time and precision specified—and four at a time.

Why not investigate the profitable adaptation of the Automatic VERTICAL to work in your shop? Write for literature.



Ask your CONE representative to show you complete color motion picture

# CONE

AUTOMATIC MACHINE CO., INC. • WINDSOR, VERMONT, U.S.A.



## ***FAST FIGURE READING*** **WITH STANLEY "Flud-Lite" MAGNIFIER** **SPEEDS PRODUCTION**



Instant, accurate readings of scales and dial indicators are easy with STANLEY "Flud-Lite" MAGNIFIERS . . . the magnifier that carries its own light. They also speed up inspection of machine parts, dies and similar operations as well as promote more accurate line assembly.

You get *better work faster* with this combination of a shadow-free fluorescent floodlight and big 5-inch, non-distorting magnifying lens.

Available in models for either portable or permanent installation. Write for illustrated folder. Stanley Electric Tools, New Britain, Connecticut.

THE TOOL BOX OF THE WORLD

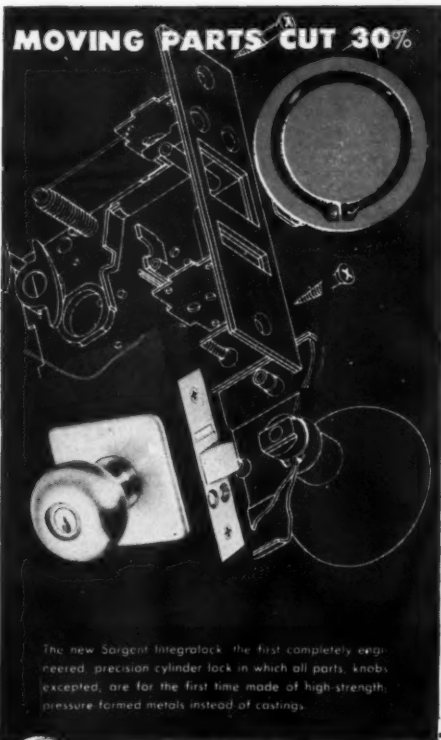
**STANLEY**

Trade Mark

***HARDWARE · HAND TOOLS · ELECTRIC TOOLS***

# TRUARC helps Sargent produce superior lock at lower cost!

**MOVING PARTS CUT 30%**



The new Sargent Integratlock—the first completely engineered, precision cylinder lock in which all parts, knobs excepted, are for the first time made of high-strength, pressure-formed metals instead of castings.

Send for booklet containing interesting engineering data.



**WALDES  
TRUARC**

**RETAINING RINGS**

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, N. Y.



**"TRUARC HELPED MAKE THIS LOCK POSSIBLE"** says Sargent & Company, New Haven, Conn., leading lock manufacturers for 74 years.

**IN DESIGN:** "Waldes Truarc Retaining Rings permit closer tolerances; result in more compact design; provide full circumferential bearing at vital points; help to make possible a 30% reduction in moving parts."

**IN PRODUCTION:** "Truarc reduces machining operations, cuts assembly time, helps eliminate the grub screw hitherto universally deemed essential."

**IN SERVICE:** "Truarc maintains accurate, unvarying relationship of parts, simplifies disassembly and reassembly, reduces possibility of damage in making repairs."

**IN COSTS:** "The many advantages provided by Truarc have contributed to the great economies that enable us to produce this finer-lock at a new low cost for a quality product."

Whatever your product, whether old and basic, or a comparative newcomer, there's a Waldes Truarc Retaining Ring that will make it simpler, more economical to make and repair. For Truarc, with its never-failing grip and patented design assuring constant circularity, gives you a new approach, a superior solution to fastening problems. Send us your drawings; Truarc engineers will be glad to show how Truarc can help you.

Waldes Kohinoor, Inc.,  
47-10 Austel Place  
Long Island City 1, N. Y.

22-H

Please send Booklet on Truarc Retaining Rings to

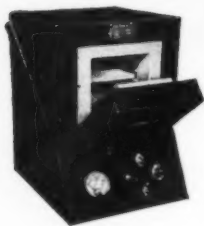
Name & Title \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

VISIT TRUARC BOOTH AT NATIONAL METAL CONGRESS, ATLANTIC CITY, NOVEMBER 18-22



# LUCIFER

## ELECTRIC HEAT TREATING FURNACES

### WITH AUTOMATIC HEAT CONTROL

#### SPECIFICATIONS

- Interior size—Model 7051—5½"x5½"x6"
- Exterior size—15"x15"x17"
- Operation—110 V. A.C. only
- Rating—1.2 K. W.
- Ship. Wt.—Approx. 85 lbs.
- Operating cost—Approx. 3c per hr.

PRICE \$112.00 f.o.b. Factory, Philadelphia

#### SPECIFICATIONS

- Interior size—Model 7053—8"x8"x10"
- Exterior size—18"x20"x24"
- Operation—110 V. A.C. or 220 V. A.C.
- Rating—3 K. W.
- Ship Wt.—Approx. 225 lbs.
- Operating cost—Approx. 6 to 8c per hr.

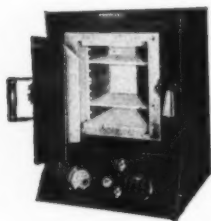
PRICE \$188.00 f.o.b. Factory, Philadelphia

#### SPECIFICATIONS

- Interior size—Model 7052—12"x12"x10"
- Exterior size—22"x22"x24"
- Operation—220 V. A.C.
- Rating—4.8 K. W.
- Ship. Wt.—Approx. 350 lbs.
- Operating cost—Approx. 10 to 14c per hr.

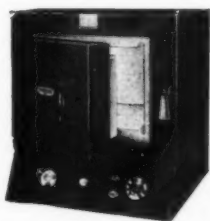
PRICE \$260.00, f.o.b. Factory, Philadelphia

Just what you have been waiting for. Electric heat treating furnaces that are easily operated; you can do your own heat treating — harden and temper dies, punches, gauges, jig and fixture parts, normalize weldings and castings. It's easy with a "LUCIFER" because it has the "LUCIFER" automatic electric heat control that permits stepless control of any predetermined heat within its range up to 2000° F. All "LUCIFER" furnaces are equipped with indicating built in pyrometers calibrated both in Fahrenheit and Centigrade, pilot light, control switches and automatic control devices. You can now equip your old Furnace with a Lucifer Automatic Heat Control unit 110 or 220 V. A.C. up to 5 K.W., from \$27.50 to \$41.50 complete. We can also supply a 7 day Control, which will turn your furnace on in the morning and off at night, shut off at noon Saturday, skip Sunday and repeat each 7 days. \$27.50 complete. All prices are F.O.B. factory Philadelphia, Pa.



#### DEALERS:

Write for our interesting offer to qualified distributors. Desirable territories open.



#### DISTRIBUTORS

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*Service Machine Co. Presents*

# The New Modern Design

## Rousselle Punch Press



10-ton Capacity

- ★  
Extra Heavy Frame
- ★  
Replaceable Bearings
- ★  
Non-Repeat Safety Device
- ★  
High Speed Production
- ★  
Oversize Clutch Mechanism
- ★

# Service Machine Company

7633 South Ashland Avenue

Chicago 20, Illinois



## With Two DI-ACRO BENDERS

A difficult production problem of forming two bends in a long length of tubing was solved by "teaming up" two DI-ACRO Benders as illustrated. This dual-forming arrangement saved installation of special machinery. Two accurately formed bends are obtained in one operation—without distortion of the tube and at a cost competitive to power operated equipment. More than 300 pieces are completed per hour—600 individual bends.

### "DIE-LESS DUPLICATING" Often Does it Quicker WITHOUT DIES

This is but one example of how DI-ACRO precision machines—Benders, Brakes and Shears—can accurately and economically duplicate a great variety of parts, pieces and shapes, without die expense. Write for catalog—"DIE-LESS DUPLICATING".

◀ DI-ACRO is pronounced "DIE-ACK-RO".



**O'NEIL-IRWIN mfg. co.**



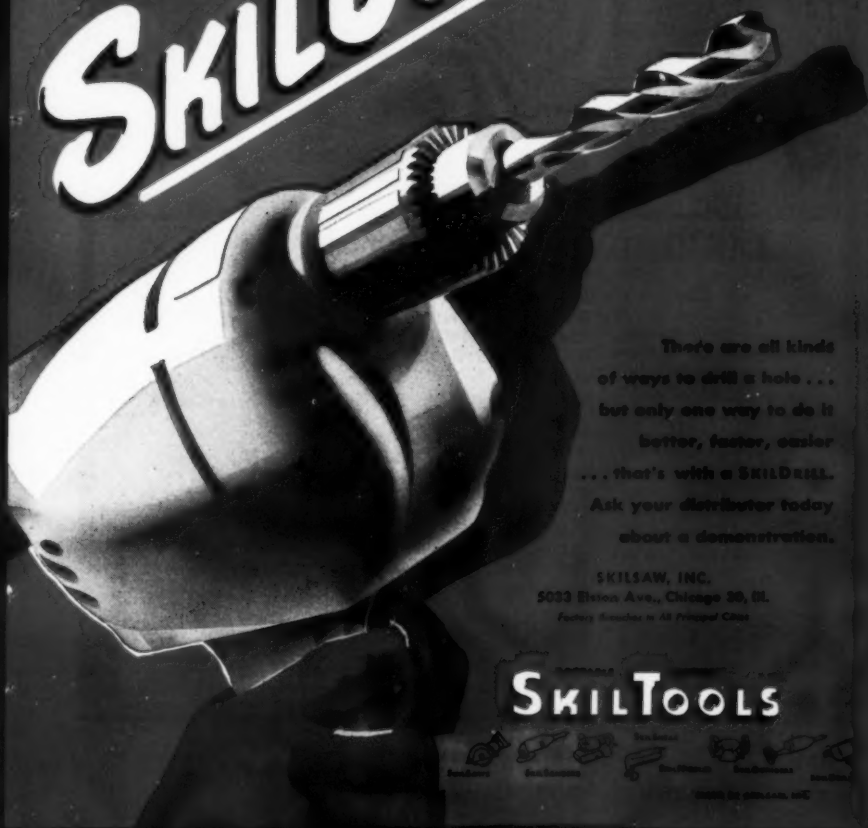
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DON'T JUST DRILL IT...

**SKILDRILL**

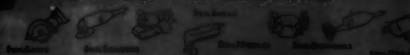
**IT!**



There are all kinds  
of ways to drill a hole ...  
but only one way to do it  
better, faster, easier  
... that's with a SKILDRILL.  
Ask your distributor today  
about a demonstration.

SKILSAW, INC.  
5033 Stoner Ave., Chicago 30, IL.  
*Factory branches in all principal cities*

**SKILTOOLS**



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**DEDICATED...**  
**TO IMPROVED PRODUCTION**  
**METHODS FOR**  
**GRINDING, POLISHING**  
**AND FINISHING—**  
**FOR ALL INDUSTRY**



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Abrasive engineering, to effectively increase man-hour production must include the recommendation and demonstration of abrasive equipment as well as the abrasive itself. To this end, Behr-Manning has pioneered a new abrasive engineering service—branch-located methods and equipment demonstration rooms—for lab-testing tool-ups, locally.

Inaugurated last winter, this service has been recently augmented by the opening of additional demonstration rooms at our branches in New York, Philadelphia and Cincinnati.

May we suggest that you too may find this service helpful in either improving some present abrasive operation or in simplifying some non-abrasive method through conversion to abrasives. Write or phone our nearest branch or write for booklet, "Your New Laboratory, Sir."



**BEHR-MANNING • TROY, N.Y.**

(DIVISION OF NORTON COMPANY)

**QUALITY COATED ABRASIVES SINCE 1872**



# HERE'S HOW TO CUT MILLING COSTS!



**NEW**  
**Cal-Cutter**  
SOLID CARBOLOY  
INSERTED BLADE  
MILLING CUTTERS

## CHECK THESE FEATURES:

- ✓ FULL-BODIED INSERTED BLADES CUT GRINDING COST APPROXIMATELY 2/3
- ✓ IMPROVED CHIP CAVITY—FREE CUTTING CHIP CONTROL
- ✓ IMPROVED METHOD OF HOLDING WEDGES
- ✓ SMOOTHER OPERATION WITH EXTRA BLADES
- ✓ MILLS ANY MACHINABLE MATERIAL
- ✓ WEDGE AND BLADE DESIGN ELIMINATE SLIPPAGE
- ✓ HIGH GRADE ALLOY STEEL BODY
- ✓ INCREASED CUTTING AND IMPACT STRENGTH OF BODY AND BLADES

Now . . . chop dollars off milling costs with this new Cal-Cutter! You'll improve work quality, speed and cutter performance because of these new and exclusive Cal-Cutter features: Larger blade size . . . tests prove this reduces blade breakage and eliminates slippage. Grinding is simplified, too . . . the extreme precision of Cal-Cutter manufacture permits grinding blades separately on a surface grinder . . . reducing grinding time by approximately 2/3. Another Cal-Cutter development . . . locating the anchor wedge behind, instead of before the blade . . . that means a more efficient chip cavity—freer cutting because chip control cavity guides chips away from the work—better quality work. A wider range of rake angles may be ground, so that the cutter (with proper quality Carboloy blades) will mill any machinable material. Two extra blades reduce chatter and greatly lengthen tool life. Get this new cutter from your Cal-Cutter distributor now . . . and save!

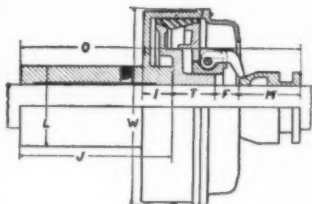
**Cal-Cutter COMPANY**  
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*It  
Didn't Just  
"Happen"!*



**Hanson Friction  
Clutch, Type C**

Study the Hanson Friction Clutch, Type C, here illustrated. Notice its sturdy, compact construction. That didn't just "happen". It's the result of years of research and experience in building industrial clutches.



Its powerful wedge action and gradual contact of moving parts produce the easiest action and yet the greatest power transmission of any clutch of like size on the market. No speed limitations — can be adjusted to absolute uniformity by single adjustment. Here again, "it didn't just happen".

Write for catalog B-116 or tell us about your specific requirements.

Our engineering facilities are at your disposal.

— a clutch for every purpose, regardless of load or speed!

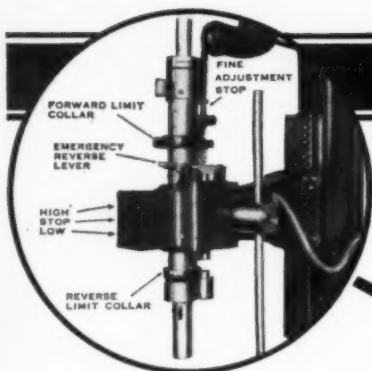
**THE HANSON CLUTCH & MACHINERY CO.**  
**TIFFIN, OHIO**

**HANSON** *Friction Clutches*

*for every clutch requirement, regardless of load or drive speed.*







*Avey*

**FEATURE No. 1**

## THE *Avey* TYPE MA-6 AVEY-MATIC POWER FED HAND FEED AND REVERSING MOTOR TAPPING MACHINE

*features*

### hand feed reversing motor for tapping

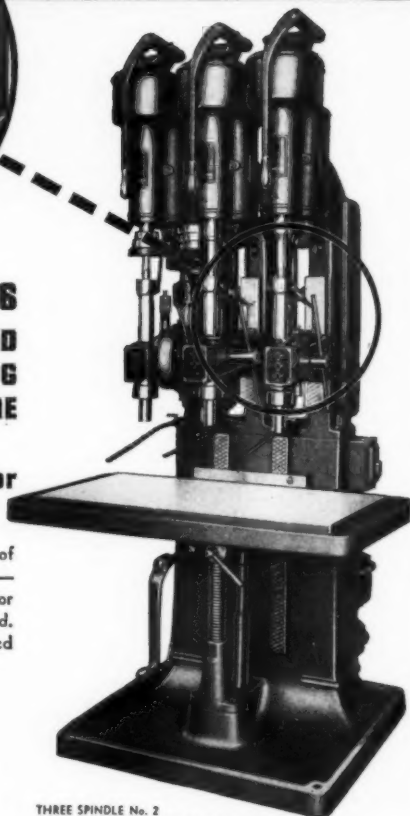
Dog control for depth — maintaining accuracy of depth within one-half revolution of the spindle — or emergency relief lever used to reverse motor if necessary before tapping cycle is completed. The natural motion of the spindle sleeve is used to control the reversing of the motor.

Type MA-6 is made in following capacities:

No. 2 —  $\frac{3}{8}$ " capacity in cast iron.

No. 3 —  $1\frac{1}{4}$ " capacity in cast iron.

THE AVEY DRILLING MACHINE CO.  
CINCINNATI • OHIO • U. S. A.



THREE SPINDLE No. 2  
TYPE MA-6 • COMBINATION MACHINE  
1st Spindle - Avey-matic Feed  
2nd Spindle - Hand Feed  
3rd Spindle - Tapping (Reversing Motor)



# MILLING MACHINES IN STOCK --- FOR IMMEDIATE SHIPMENT



Current production conditions put us in a position to offer a number of Cleveland No. 1 Vertical Milling Machines for immediate shipment. These are fresh-from-the-production-line . . . factory inspected standard machines.

The specialty of Sommer and Adams for more than a quarter of a century has been the designing and building of special purpose machinery—mostly aimed at doing something no other machine will do, all aimed at cutting time and cost in production. S and A creations range all the way from two-story, fully automatic multi-operation machines to small items like the Cleveland Vertical Milling Machine, at left.

This is a small, rigid, high-speed unit embodying all of the features essential to modern milling practices. Popular demand has converted it from a special machine to a standard item which thousands of tool and die makers, and production plants find a practical necessity.

Ten chances to one there's a spot for one of these productive machine tools in your shop.

It is probable, too, that S and A have the answer, in their years of special design experience, to some particular production problems hampering your cost control.

\*Subject to prior sale, current available stock will be shipped immediately upon receipt of order.



THE

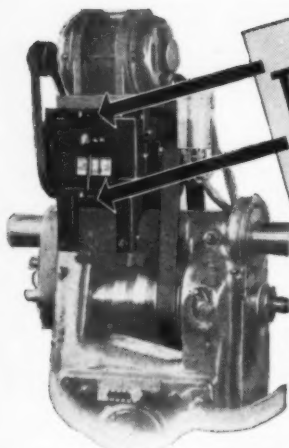
**SOMMER & ADAMS**

COMPANY

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*Custom-Built* EQUIPMENT FOR MANY PURPOSES

Subsidiary of the FEDERAL MACHINE AND WELDER COMPANY



**Two Handles**  
for  
**INCREASED  
PRODUCTION**

On the Sensational  
**New 9-Speed**

**TURNER**  
**UNI-DRIVE**  
Motorizes Machine Tools

● Nine speeds...overall ratio  $9\frac{1}{2}$  to 1 in three ranges of three speeds...3 to 1 ratio in each range...high speeds for brass and aluminum, medium for low-carbon steels, low for tough alloys...ideal for drilling, machining, tapping.

## 5 Superior Features

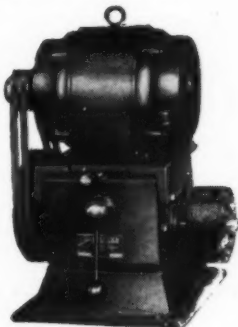
- Streamlined, lightweight aluminum alloy case...for better balance, greater rigidity.
- Eight-spline, chrome-nickel steel shafts.. precision ground, set in anti-friction bearings.
- Hardened steel gears operate in oil bath...for longer wear at greater shock load.
- Two handles control 3, 4, 6, or 9 speeds...impossible to engage two sets at once.
- Garlock grease seals eliminate leakage on ground shafts and shifter handle rods.

**D**ONT let your machines "loaf" on the job...when production is so vital! Keep them at peak efficiency with the Turner UNI-DRIVE. This sensational selective sliding gear transmission...now equipped with 3, 4, 6 and 9 speeds...makes machines more versatile, provides the proper speed for any job. Boosts output...saves time...keeps power costs down. Quickly, easily installed. Built for years of service. No overhead counter shafts...no belts to shift.

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**No. 509 SMB**  
**5 HP Special**  
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● Neat...compact...sturdy...and efficient. Designed for maximum operator and machine efficiency.



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Sales Division, Turner Machinery Co.

Dept. 104

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**NEWS**



### BAYFLEX RAISED HUB DISC WHEELS

are outwearing coated abrasive discs on thousands of jobs. This is really good news for foundries, welding shops, sheet metal shops, automobile and truck body repair shops, or wherever grinding and polishing of any type of welded or brazed metal is a problem.

#### ADVANTAGES:

- 1—Flat surface and edge can be used for grinding. Edge can also be used for cutting off.
- 2—Excellent for grinding aluminum castings.
- 3—No "loading" under normal conditions.
- 4—Unexcelled for grinding into grooves and corners, and large radii on castings.
- 5—Will fit any standard machine using coated discs.
- 6—Bayflex discs, unlike coated discs, can be used efficiently right down to the nut. This means time and money saved.
- 7—Available in a variety of abrasive grit sizes.

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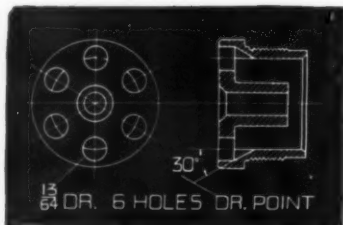
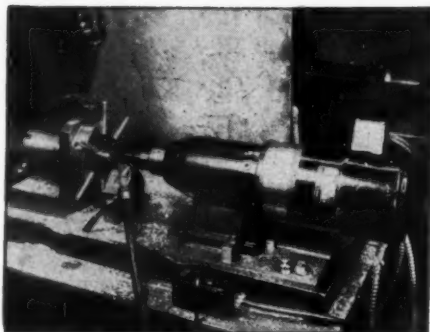
Branch offices and warehouses—Chicago—Detroit. Distributors—All principal cities.

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*Top Performance Consistently Duplicated*

**BAY STATE ABRASIVE PRODUCTS CO. • WESTBORO, MASSACHUSETTS, U.S.A.**

**1200 HOLES DRILLED PER HOUR  
--WITH A SINGLE SPINDLE**



The New Model "K" Automatic Drilling Unit, installed on a hand-indexing fixture at McLaren Screw Products, Detroit, is achieving the phenomenal production rate of 1200 holes per hour, using a 13/64" diameter drill with a 30° included angle on point.

If you would like to step up your own production rate in drilling holes up to 3/8" diameter, send blueprint or part for our recommendation. No obligation.

**WRITE FOR  
*Literature***

**GOVRO-NELSON CO.**

**1933 Antoinette  
Detroit 8, Mich.**

*Automatic* **DRILLING UNIT**



## Repeating a Good Performance . . .



## . . . at a hundred different spots

The picture above was taken in the plant of a big, nationally known metal fabricator; user of more than one hundred Racine heavy duty Hydraulic Production Saws. Stock rests illustrated are the customer's own design and construction. The machines are used for cutting billets, and shaped materials in production quantities, as well as for test cuts and special operations.

Repeated purchase of Racine Equipment was based on specific performance records. Easy loading, accurate work, big output, dependability and low upkeep costs insure continued economies, to meet current competition and high labor costs.

Racine Machines provide these features. Single lever control of powerful hydraulic, progressive feed, the correct metal cutting principle. Open front for quick loading and pivoted arm for proper blade application. Rugged construction with few moving parts. There are several models of Racine Machines in all capacities from 6" x 6" to 20" x 20". Ask for copy of our complete catalog No. 12.

### Racine oil hydraulic pumps and valves

Power movement operations can be handled to better advantage with hydraulic force. Use RACINE variable volume Pumps, available in capacities from 0 to 30 G.P.M. Pressures from 50 to 1000 lbs. P.S.I. Control Valves for hydraulic circuits from  $\frac{3}{8}$ " to  $1\frac{1}{2}$ " I.P.S. Get our catalog P-10-C. Write today.

**RACINE TOOL and MACHINE COMPANY**  
1754 State Street • Racine, Wisconsin



**RACINE**  
STANDARD FOR QUALITY AND PRECISION

# PRODUCTO HAND TAPPERS

The one machine needed in every tool, die and machine shop. Will save its cost many times over. Designed for toolroom work to close limits. Built to withstand hard shop use. Quickly adjustable to position taps at any place on table. Now made in 3 sizes... 2 bench types, capacities  $\frac{1}{4}$ " and  $\frac{1}{2}$ " taps; and Universal Pedestal type, capacity 1" taps. Once in your shop, you will never be without it. Write for descriptive bulletin.



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# FORMSPRAG

THE FULL COMPLEMENT

*Over-Running Clutch*

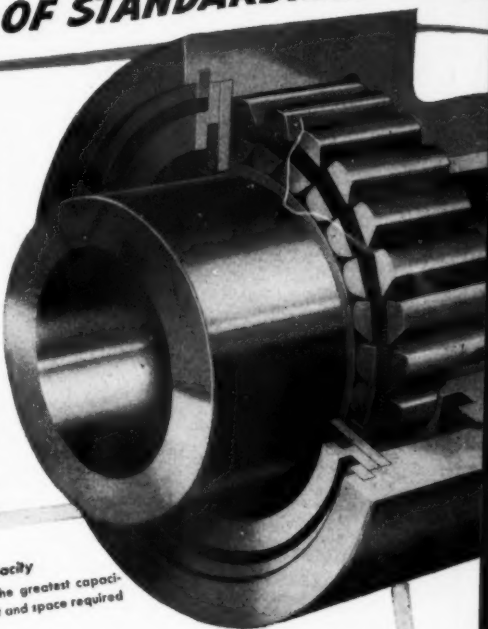
IN A WIDE RANGE OF STANDARDIZED SIZES

Formsprag is now available in standardized sizes that meet most requirements of the designing engineer. These sizes cover a wide range in capacities. The plain bearing types, for instance, have torque capacities running from 240 to 123,000 inch pounds, and bores from  $\frac{3}{8}$ " to 4".

The ball bearing clutch is also made in a wide range of sizes.

In Formsprag there is no lost motion, no backlash, no slipping. It overruns freely at the slightest reduction in the speed of the driving member, and engages smoothly and positively. Formsprag is enthusiastically endorsed by the manufacturers of bread wrapping machines, box making machines, spring coilers, canning machinery, punch press feeds, textile weaving machines, paper and rubber calendars, printing presses, dual power drives, dry cleaning equipment, machine tools and many other types of equipment.

The standardized line meets most requirements, but where special applications are necessary our engineers will gladly make recommendations.



## SUPERIOR PERFORMANCE

The performance of FORMSPRAG, in widely diversified industries, offers testimony to Geagrin's sound engineering, precision manufacture and proper application.

## Full Complement of Sprags

With the annular space between driving and driven members completely filled with sprags, there is no need for cages to position them. Torque load, therefore, is distributed over the greatest possible area. Longer life is the result.

## High Torque Capacity

Formsprag offers the greatest capacities for size, weight and space required for installation.

## Simple Construction

Cylindrical inner and outer races on which no localized wear can develop. No internal or external cams. No cages. End notches shaped to retain energizing spring and protect sprag gripping surfaces against concentrated end load. Easy installation.



## WRITE FOR LITERATURE

Give full information—a description of the operation, normal maximum torque at speeds, the number of time units the clutch engages disengages, and other pertinent data.

*The* **GEAR GRINDING MACHINE COMPANY**  
DETROIT 11, MICH. U.S.A.

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## with **SIEWEK** *Fixture Clamps and Fittings*

- Cut fixture designing and drafting time 50% to 75%
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- Quick setting... Saves valuable time on all production
- Eliminate service of toolmaker—9 times out of 10

**24 DIFFERENT TYPES  
3 SIZES EACH**

### **Announcement!**

The widely popular line of Siewek Rapid Clamping Jigs and Siewek Fixture Clamps and Fittings now under new ownership of experienced management, design and technical executives.

*Also...* JACKS • JACK LOCKS • FIXTURE LOCKS  
REST BUTTONS • RESTS AND CAMS • HAND KNOBS

Instead of designing "specials," use Siewek clamp assemblies and parts... the time saved in planning and drafting pays for the cost of the complete assemblies. We furnish full size template drawings to trace from when making layouts.

Heat-treated and hardened Siewek clamp bars give years of service—with ample safety margin. Uniform, right-angle pressure assures secure holding. Write today for full size template drawings for layout use.

*Distributors in Principal Cities*

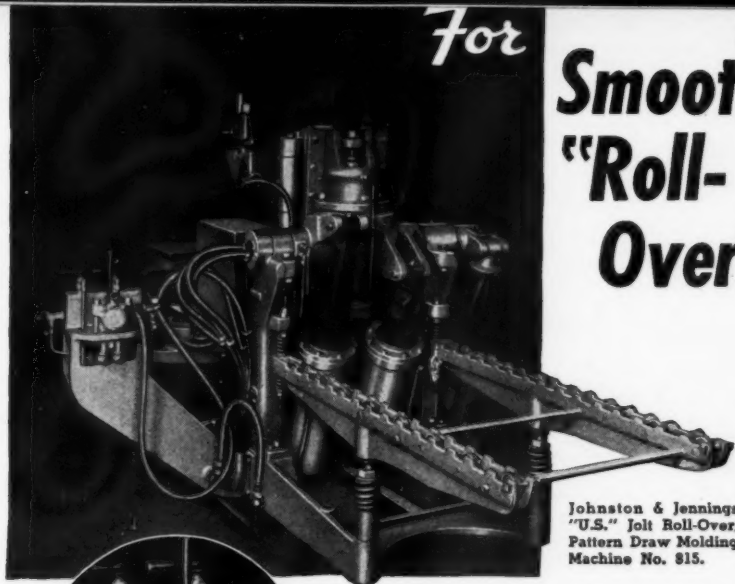
## **SIEWEK TOOL COMPANY**

**2862 East Grand Boulevard**

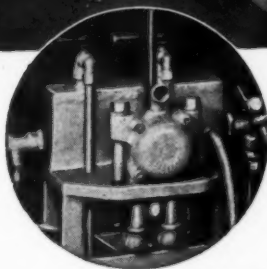
**Detroit 2, Michigan**

For

# Smooth "Roll- Over"



Johnston & Jennings  
"U.S." Jolt Roll-Over,  
Pattern Draw Molding  
Machine No. 815.



Above: Close-up view of Nopak 1/2" 5-position Manifold Valve. This is essentially a 3-way valve for staggered actuation of 2 single-acting cylinders.

## ... Johnston & Jennings Specifies **N O P A K** 5-Way Manifold Valves

"U.S." Jolt Roll-Over, Pattern-Draw Molding Machines are built for continuous, rugged service under arduous working conditions. Smooth, controlled

sequence of cylinder action is required to actuate the heavy roll-over mechanism hundreds of times a day, with a minimum of wear, shock, and vibration.

NOPAK Valves are ideally suited to this purpose because the valve disc rotates at right angles to the stream flow. This basic NOPAK principle provides positive control through the complete cycle of valve operation...from slow, gradual, throttling action to immediate opening of full pipe area...without damaging shock or impact.

Specify NOPAK Valves for smooth, shockless control of air or hydraulic power, either in your plant equipment or machines you build for resale.

GALLAND-HENNING MFG. CO., 2754 S. 31st St., Milwaukee 7, Wis.

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**VALVES AND CYLINDERS**  
DESIGNED for AIR and HYDRAULIC SERVICE

28th NATIONAL METAL EXPOSITION  
ATLANTIC CITY AUDITORIUM NOV 18-22

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**a SENTRY High Speed  
Steel HARDENING  
FURNACE in operation**



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Sentry Model "Y" Furnaces with Sentry Diamond Block controlled atmosphere produce uniform, scale-free, true-to-size work — no decarburization. Replace your old cumbersome furnaces with one or more Sentrys for real economy. Capacities to meet your requirements.

**Just off the press.** Two new Sentry catalogs describing our High Speed Steel Hardening Furnaces, Sentry Diamond Blocks and Accessories. Ask for your copies at the show or write us for bulletins 1053 and 1053-D10



**The Sentry Company**  
FOXBORO, MASS., U. S. A.



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**GROBET  
SWISS FILES**  
**OVER 5,000 SHAPES  
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# they're dependable

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Vertical Milling  
Machine uses  
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That's what users of Curtis Universal Joints say.

Yes, you too can rely on Curtis Universal Joints for dependable, smooth, trouble-free operation.

Experience and "know-how" gained in manufacturing universal joints, exclusively, for more than 20 years — with every production operation being done in *One* plant, the largest of its kind — guarantees such dependability. Curtis is continually making minor changes in design, or materials and heat-treatment that improve Curtis Universal Joint dependability. For dependable service order from Curtis. War surplus or joints made several years ago do not meet present day quality.

Curtis Engineers are ready to help you at all times. Write for useful drafting templates and descriptive folder.

Write Dept. B-1

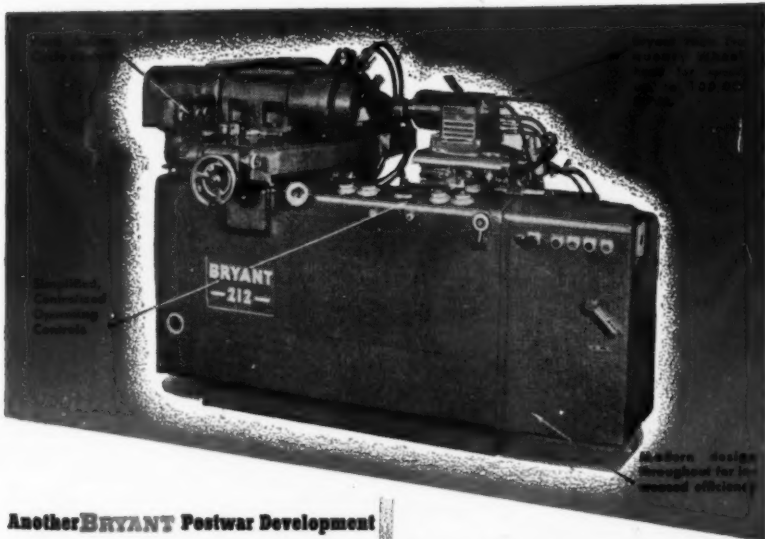


**CURTIS UNIVERSAL JOINT CO. INC.**  
1 BIRNIE AVENUE, SPRINGFIELD, MASSACHUSETTS



*Announcing a  
New Automatic  
High Production  
Internal Grinder*

**No. 212**



**Another BRYANT Postwar Development**

The new No. 212 Bryant Grinder is designed to fill the pressing need for greater production per man hour. It is a fully automatic internal grinder that requires a minimum of operator attention—in fact on many jobs one man can run two machines. Production is higher, more precise and more profitable with this new grinder.

The new No. 212 Bryant roughs and finishes bores from  $\frac{1}{8}$ " to 6" (approx.) in diameter in lengths up to 3 inches. On the smaller bores, it is especially suited to the use of Bryant High Frequency wheel spindles which operate at speeds up to 100,000 r.p.m.

The No. 212 design incorporates the superiority of Bryant three point wheel slide suspension and insures maximum rigidity under all conditions.

Movements of the machine are hydraulically operated, while the cycle is controlled electrically to facilitate change-over. Sizing is accomplished accurately and automatically by any one of three methods: a plug gage mounted in the work spindle, a diamond tipped bore contact, or controlled by the wheel truing diamond. It roughs and trues and finishes and stops automatically—producing parts with fine work finish to tolerances that insure bores that are straight and round, making the products which you manufacture more desirable because they run smoother and live longer.

If grinding figures in your production plan, your move for best results is to—

**SEND For The Man From Bryant.**

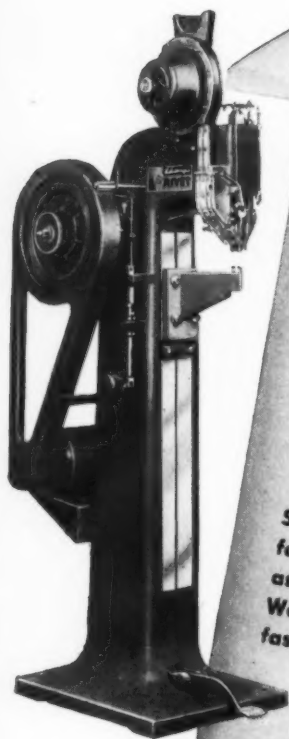
**BRYANT**



**BRYANT CHUCKING GRINDER CO.**

SPRINGFIELD, VERMONT, U. S. A.

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CALL

*Chicago Rivet*

Our engineers have lowered assembly costs and improved the products of hundreds of manufacturers, and they can probably do the same for you. When you call on Chicago Rivet fastening specialists, you get the benefit of 26 years of solving hard fastening problems.

## *Free* FASTENING CLINIC

Send us a drawing or unfastened sample or sub-assembly of your product. We will gladly analyze your fastening needs, recommend the type of rivet and Chicago Automatic Rivet-Setter to do the job best, and submit estimated production rates. No charge or obligation.

(Illustrated)  
Model 121

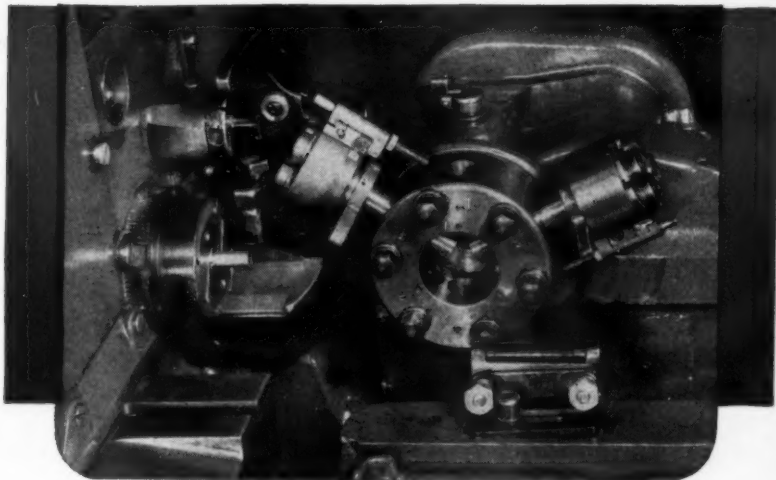
Chicago Automatic  
Rivet-Setter

## CHICAGO RIVET & MACHINE CO.

9610 W. Jackson Blvd., Bellwood, Ill. (Chicago Suburb)

Automatic Rivet-Setters • Tubular and Split Rivets in all Rivet Metals

C 3



**NEW**

## POSITIVE-ACTING VERS-O-TOOL DIE HEAD

For Brown and Sharpe Automatics

Here's a die head that doesn't miss. Positive cam action closes the head and *keeps* it closed during the non-cutting part of the cycle. And the famous Namco Vers-O-Tool action insures automatic opening when the *exact* length of the cut has been reached.

*Literature and prices on request.*

### EXCLUSIVE VERS-O-TOOL FEATURES

- Interchangeable circular milling cutters and ground thread chasers
- Multiple cutting through four circular cutters
- Close limits of tolerance and concentricity
- Quick diametric adjustment
- Micrometer control for regrinding
- Hardened and ground parts for long life and accuracy

**The NATIONAL ACME CO.**

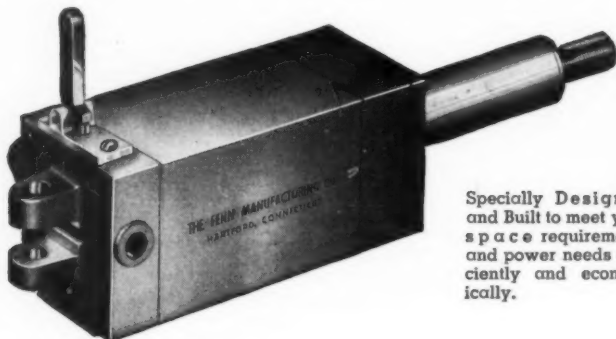
170 EAST 131st STREET • CLEVELAND 9, OHIO

Acme-Gridley Bar and Chucking Automatics;  
1-4-G and G Spindle • Hydraulic Thread  
Rolling Machines • Automatic Thread  
and Taps • The Chromolog • Limit Motor Starter  
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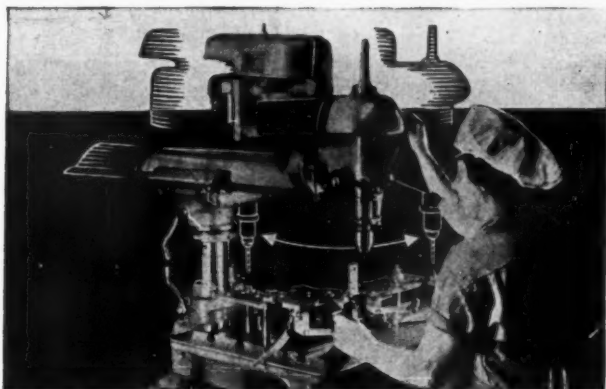
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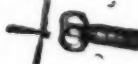
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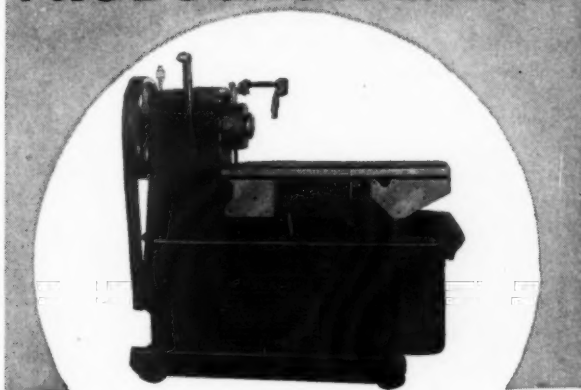


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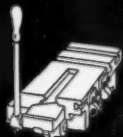
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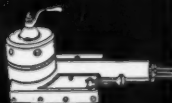
CROSS-SLIDE: Hand  
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CROSS-SLIDE: Rack and  
pinion feed



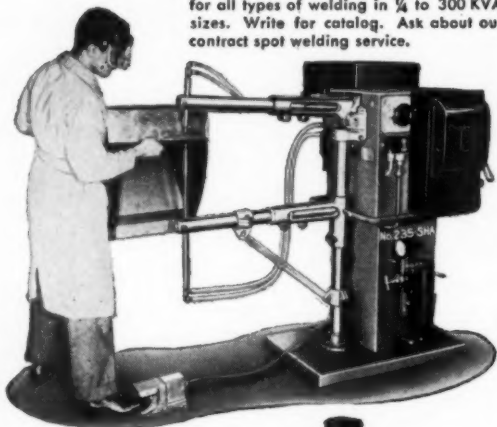
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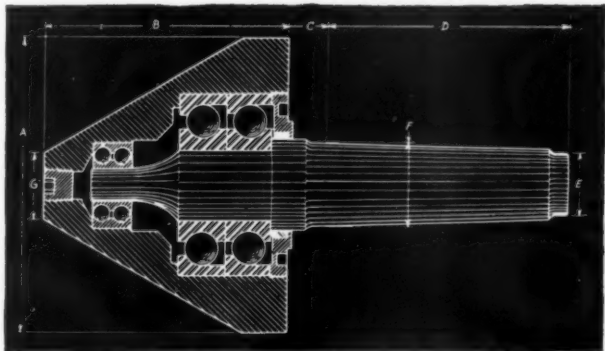
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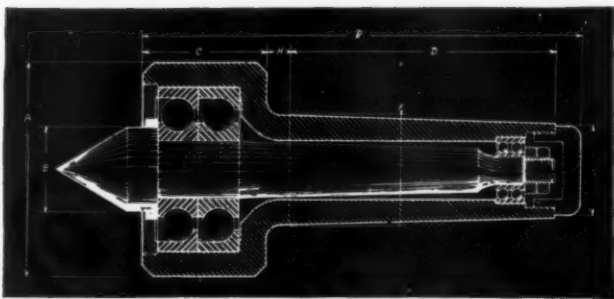
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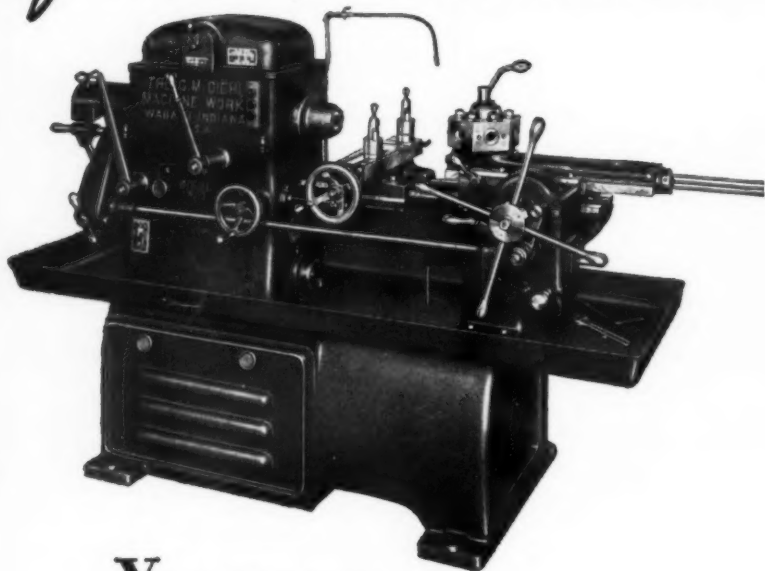
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# Featured In This Issue

**DESIGN CONSIDERATIONS FOR WELDED MACHINERY PARTS.** This is part one of a continued article on this subject by George L. Snyder of Lukens Steel. Here is a practical (not theoretical) discussion of ways and means of doing better work for less money by using "Design Considerations". Page .....135

**PRECISION MEASUREMENT.** Part 5, describes mechanical comparators as inspection instruments. Warren Baker, the author continues to give us valuable information, on a technical subject, in an easy-to-understand manner. Page .....159

**LETTER FROM ENGLAND.** We are pleased to announce that we have made an arrangement to exchange a letter each month with "Machine Shop Magazine" of London, England. Robert Hutcheson, their editor, will give us a cross-section of what is going on over there. We will do the same for them regarding conditions here. Page .....191

**FUNDAMENTALS OF EXPORT SELLING.** Here is a subject upmost in the mind of many manufacturers today. Ralph Colorado, an authority on export matters, gives a comprehensive survey of the subject with many valuable suggestions. Page .....205

**KEY FACTS ABOUT KEYS.** As the author, H. F. Williams states, the title should be "More Facts About Keys" as this is really a request en-core to an article on the subject that we published last June. A number of our readers asked for more, so here it is, Part I of two parts. Page .....223

**INTERNAL GRINDING PRACTICE.** If part 2 of this series by John Hyler causes as much interest as part one

has, we will know that Wesley Paulson's judgement was sound in selecting this subject. For a while he hesitated about starting on internal grinding, now we are glad he did. For those of you who missed Part I we have a few copies left. First come first served. Page .....249

**CARBIDE DRAWING DIE PRACTICE.** Daniel Mapes, V. P. of Walter Kidde & Co., Inc., tells of their experience in the use of Carboloy cemented carbide dies for deep drawing. He tells why they favor it. Page .....263

**IT'S YOUR OWN BUSINESS.** Sounds like an impudent suggestion yet, when you read the article, you'll feel like we did that the author had many good reasons for his remark, and maybe he was talking to the other fellow. Page .....283

**SHOP HINTS.** Page .....298

**YOUR TAX PROBLEMS.** "Preview your 1946 tax return now," says Arthur Roberts, and he gives a number of good reasons why you should. Page .....301

**FORMANSHIP FORUM.** "The Seeing Eye" is the title Ed Mottershead has selected for this month. His treatment of the subject is both interesting and informative. Although written for the foreman, it would be well for management to read it also. Page .....307

**WHAT'S NEW IN METAL WORKING.** Page .....324

**LET'S TALK SHOP.** Page .....338

**NEW LITERATURE.** Page .....370

**MECHANICS THRU THE AGES** Page .....374

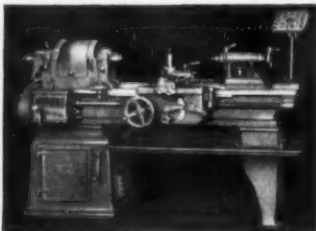
**PRODUCTS INDEX** — Affords an easy method of locating obscure products. Page .....390

# SOUTH BEND *Precision* LATHES

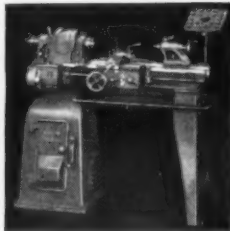
ENGINE LATHES • TOOLROOM LATHES • TURRET LATHES • ATTACHMENTS



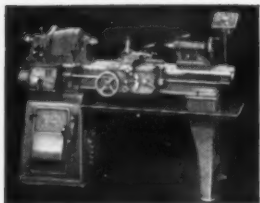
No. 1001-Z SOUTH BEND TURRET LATHE



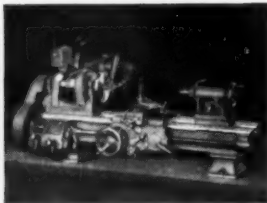
16" x 6' SOUTH BEND TOOLROOM LATHE



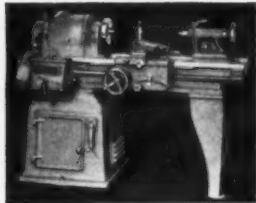
10" x 3 1/2' SOUTH BEND TOOLROOM LATHE



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Draw-in Collet Attachment



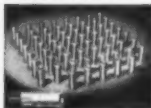
Draw-in Collet Attachment



Center and Follow Rests



Telescopic Taper Attachment



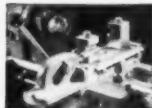
Collets and Collet Sets



Handlever Bed Turret



Square Turret Tool Block



Double Tool Cross Slide



Double Tool Cross Slide



**WESLEY G. PAULSON**

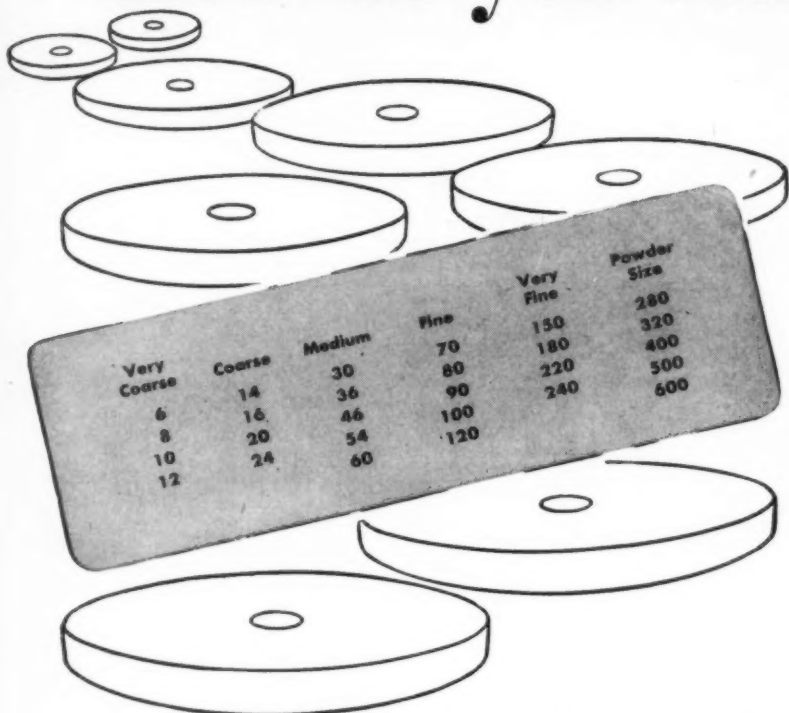
**S**INCE the last issue of MACHINE TOOL BLUE BOOK, its esteemed editor . . . Wesley G. Paulson . . . has passed on. To the thousands who knew him from coast to coast, border to border and across the seas, the news of his death at the age of 59 will come as a distinct shock and as a deep personal loss. Wesley Paulson left this world in the same manner as he lived . . . quietly . . . unassuming but confident. It was late in the afternoon of Saturday, October 5 in the presence of his wife and his sister who was reading to him from Roy Laurin's new book "Life At Its Best" that Mr. Paulson breathed his last. Although a serious heart condition had confined him to his home for a number of months, his death came with shocking suddenness to those of us who worked with him and perhaps knew him best.

During the nine years he was associated with Hitchcock Publishing Company, Mr. Paulson served as editor of MACHINE TOOL BLUE BOOK. He felt keenly his responsibility to his readers . . . a more conscientious worker at his craft we have never met. His was the art of intelligently presenting and interpreting new developments . . . new ideas in the field of metalworking which he loved and knew so well. While technical in their content, his articles were written in a style to make them readily understood . . . and practical too, for the men who relied on him for their "must" reading month after month.

Wesley Paulson had a varied experience which admirably fitted him for the editorship of the BLUE BOOK. Prior to his coming with Hitchcock he operated a shop of his own, had editorial experience on other technical papers, taught at Carnegie Tech and served in the engineering department of Westinghouse Electric in Pittsburgh.

We are certain that the many readers of the BLUE BOOK, join with us here at Hitchcock's in a sincere expression of sympathy to Mrs. Paulson, to his sister, two brothers and others who were near and dear to him. Funeral services for Mr. Paulson were conducted at the Church of the Advent (Episcopal) in Chicago and interment was in Irving Park Cemetery on October 8. Rev. Gordon E. Brant who officiated closed his message with the highest compliment which any mortal can pay to another, "Wesley was always a gentleman".

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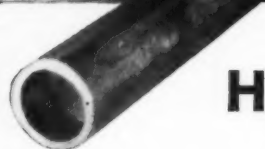
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# RYERSON STEEL

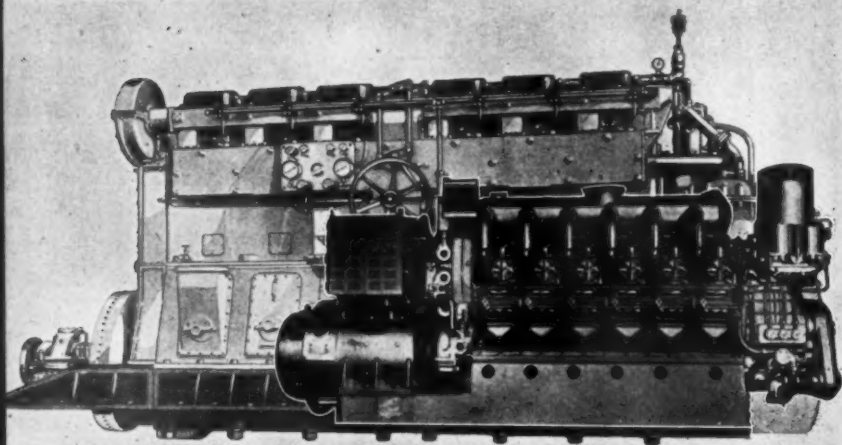
# DESIGN CONSIDERATIONS FOR WELDED MACHINERY PARTS

By GEORGE L. SNYDER\*

Part One

The result of the practical applications of the many factors discussed in this article probably can be best illustrated by a particular instance of weight and space efficiency in the use of weldments. A comparison in the picture shown here of a direct drive four-cycle Diesel engine of 1926 with an electric drive two-cycle Diesel engine of today shows that the modern, smaller engine represents a reduction of 67.39% in cubic feet occupied per bhp. and also a reduction of 58.40% in weight per bhp. The development of welded steel type construction has helped materially in effecting these results. Beside which, the lighter engine of today is 50% more efficient than the heavier engine of 20 years ago.

\*Chief Engineer and Assistant to General Manager Lukenweld, Inc., Division of Lukens Steel Company, Coatesville, Pa.



Comparative illustration showing a direct drive 4-cycle Diesel engine of 1925 with an electric drive 2-cycle Diesel engine of 1946.

### Introduction

ONLY some basic considerations for the designer in developing weldments are brought out in this discussion because of the wide scope of the subject. Separately, these basic considerations may seem elementary and self-evident, but when considered collectively in developing a weldment, their complexity becomes apparent. At least 12 different types of components can be utilized by a designer in his weldment and each of these components can be used in several ways.

So, the designer must be familiar with limitations in processing weldments and with the scope and limitation of equipment and methods used in their production.

These are the factors to be discussed

here. However, this discussion is limited to dynamically loaded welded machinery parts. Statically loaded welded structures present another broad subject and their design concept is decidedly different from that of dynamically loaded structures.

To begin with, hot rolled steel plate, a basic element, probably is the most universal component used in such structures.

Undoubtedly the freedom offered by the many sizing and shaping possibilities of hot rolled steel plate has much to do with its widespread use as weldment components. Basically flexible raw material from the standpoint of dimensions, hot rolled plate is obtainable in variable sizes to 195 inches wide or to 25 inches thick.

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Fig. 1—Component flame-cut to shape from hot rolled plate.

### Flat Components

Shearing usually is the most economical method of sizing or shaping a plate to rectangular or circular dimensions. But when a plate is to be sheared to size, the designer should keep in mind the existence of shear droop which is the abrupt break in flatness that occurs around the sheared edge because localized stresses imposed by the shear-

ing pressure exceed the elastic limit of the material. Since this effect is confined to the area adjacent to the edge, it can be practically disregarded when the component is subjected to subsequent trimming or when it is in light gages,  $\frac{3}{16}$ " and under.

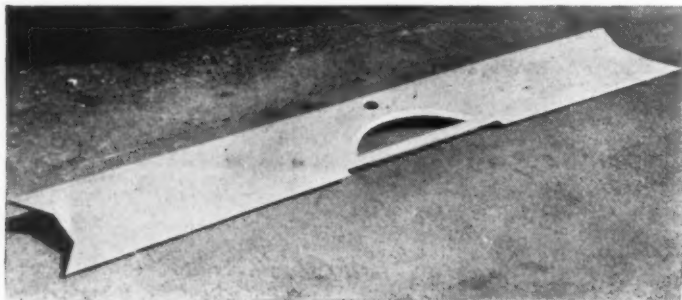
Flame-cutting, undoubtedly, is the most common method of shaping and sizing weldment components, particularly when the number of duplicate weldments required is small. Probably a big reason for this is the fact that many components of weldments necessarily are irregular in shape.

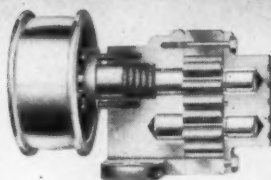
Since regular configuration generally is cheaper, the designer should think in such terms where possible. However, he need not be concerned if an edge is sheared or flame-cut as long as he designs the part so the supplier is free to use either method or both on a particular component.

Fig. 1 shows an example of component produced entirely by flame-cutting. Fig. 2 is a plate part produced by a combination of shearing and flame-cutting.

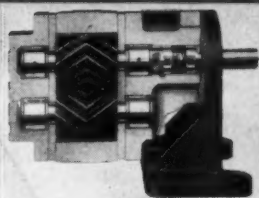
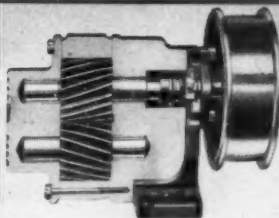
Of course, in addition to shaping and sizing, the cutting torch also makes welding chamfers, or kerfs, on the edges of a component which provides the "grooves" for welds, other than plain fillets, when assembled with adjoining components.

Fig. 2—Plate component shaped by shearing and flame-cutting.



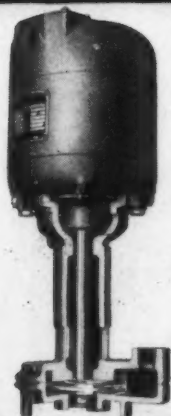


These cross-sections of rotary geared pumps show the simple, compact, sturdy design characteristic of Brown & Sharpe Pumps. Pump at left has spur gears and compression packing. Pump at right has spiral gears and mechanical seal.



This rotary geared pump for hydraulic installations has needle bearings and a double self-balancing mechanical seal in the larger sizes.

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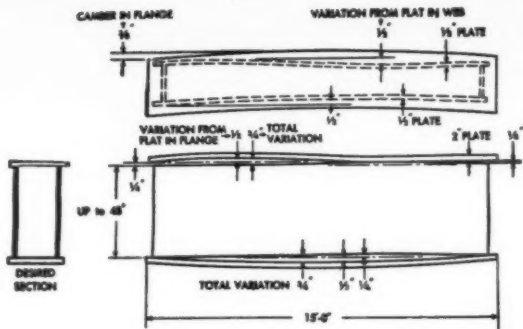
Brown & Sharpe continuously operates hundreds of pumps in its own plant. Thousands more pumps are installed on its own machine tools. As a user of pumps, therefore, Brown & Sharpe has first-hand knowledge of the practical requirements of various type pumps. And, as one of the largest manufacturers of machine equipment, Brown & Sharpe is able to apply to the manufacture of pumps its broad knowledge of machine tool manufacture. This unique combination of facilities and knowledge is responsible for the wide popularity of Brown & Sharpe Pumps for a variety of uses. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

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# BROWN & SHARPE PUMPS

Fig. 3—Box beam showing camber and flatness tolerance.



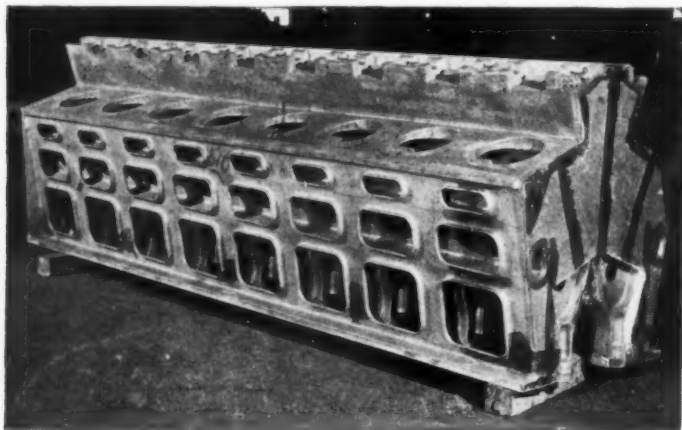
### Tolerance

Tolerance on components, disregarding the method used in producing them, merits careful consideration by the designer of weldments for an accumulation of tolerances can cause costly difficulty in fabrication, as is shown in Fig. 3. This illustration pictures a highly improbable coincidence of tolerance accumulation. Nevertheless it could occur within the limits of necessary commercial tolerances on flatness and straightness.

Tolerances are important considerations on flatness and straightness, particularly if the fabricator's facilities for performing such operations cannot be operated so cheaply as those of the supplier of components.

Often, it is advantageous to size components on machine tools, if only for the reason that much closer tolerances are obtainable. For a complicated assembly with much welding on it, prefabrication machining is indicated. Also, at times, machining of components will

Fig. 4—16 cylinder "V" type welded Diesel engine frame.





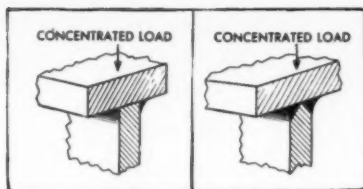


Fig. 5—Joint between heavy flange and web, showing machined edge at left, and full weld at right.

help achieve close tolerance on a complete weldment. The more generous the tolerances on components, the more prevalent the gaps in fitting. Gaps require the deposition of a greater amount of weld metal thereby increasing costs and destroying the metal-to-metal contact which resists tendencies to shrink or warp.

The main structural parts of the weldment shown in Fig. 4 are pre-machined. Since this item is one of mass production, individual peculiarities in each weldment caused by the non-uniform accumulation of component tolerances could not be allowed.

#### Prefabrication Machining

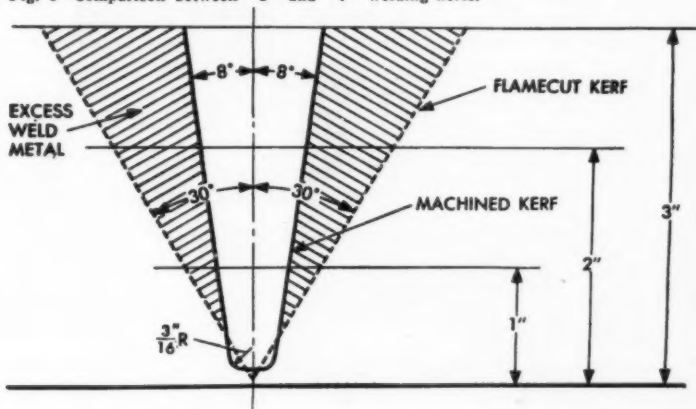
Sometimes design considerations dictate prefabrication machining as in the

case of the joint between the heavy web and flange shown at the left in Fig. 5 illustrates.

This might be a detail of construction on the bed of a large hydraulic or mechanical press. The loading in the region of the compression flange of such machines is such that the joint detail shown at the right in Fig. 5 would be necessary if the edge of the web were not machined. When machined, the metal-to-metal bearing, to withstand concentrated compression loads, is achieved. Fillet welds as indicated in this illustration are adequate then for withstanding the horizontal shear components in this region of the beam. The edging of such webs to a relatively close tolerance is a simple operation on a plate planer.

Another reason for prefabrication machining is the provision of economical welding kerfs in combination with good joint fit-up, particularly in welding thick plates. A kerf must provide sufficient width to clear the tip of the welding electrode to permit the depositing of weld metal at the root of the weld. For, as the plate thickness increases, it is apparent that the amount of metal wasted in the angularity of V-

Fig. 6—Comparison between "U" and "V" welding kerfs.



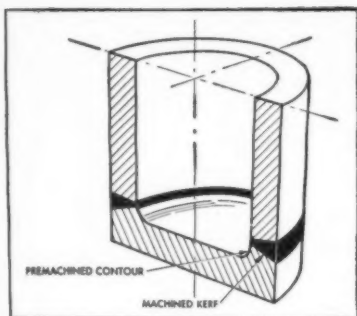


Fig. 7—Bottom of hydraulic cylinder, typical of those used in heavy hydraulic presses.

shape flame-cut kerfs in contrast to the U-shaped ones as shown in Fig. 6 becomes an important factor.

Prefabrication machining is necessary, too, in instances of conflicting tolerances, in the fitting of circular components within each other. Studies of minimum tolerances reveal that gaps between pieces so fitted are inevitable but machine fits reduce such gaps to a negligible point.

Prefabrication machining is necessary at times, also, for providing proper contours in highly stressed weldments or in those subject to fatigue. Fig. 7 shows such an instance in the bottom plate of a hydraulic cylinder pre-machined to provide proper curved contour at the corners. This sketch also illustrates an application of machined kerfs on thick plates. Fig. 8 shows the cylinder of a hydraulic press designed on such principles.

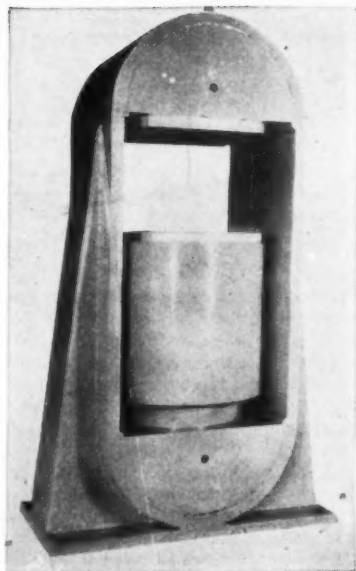


Fig. 8—Cylinder on hydraulic press.

#### Shaping Plate Components

Another method used frequently for shaping plate components is "blanking" or "punching" on a power press. This operation which is simply shearing, using knives of special shapes, can be justified, usually, only when quantities required warrant the expense of dies. Fig. 9 shows typical blanked or blanked and punched pieces.

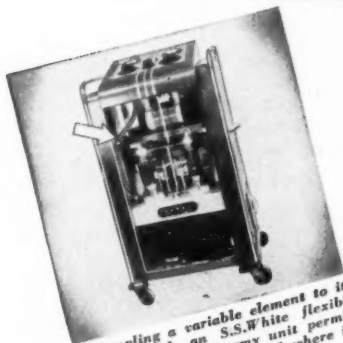
A simple example of blanking or punching is the shearing of a rectangular plate. By blanking the piece only



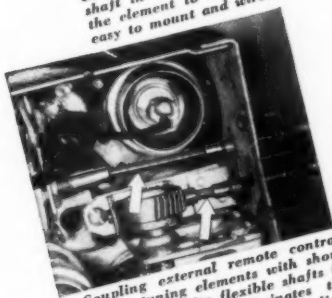
Fig. 9—Blanked, and blanked-and-punched, components of 1/4" thick steel plate.

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one operation is required in comparison to four operations for each piece which would be necessary in shearing. Hence, a comparison of blanking and shearing costs can be made merely by multiplying the cost of the added three shearing operations by the number of pieces required and comparing this with the cost of tooling. Naturally, the estimate will be approximate since the relative cost per hour of the machines used might affect the comparison. Another important benefit gained by blanking is the comparatively close tolerance that can be achieved.

### "Formed" Components

Thus far, we have considered only flat pieces in the preparation of com-

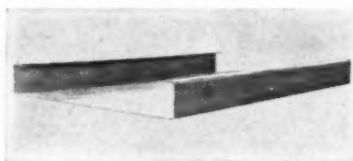


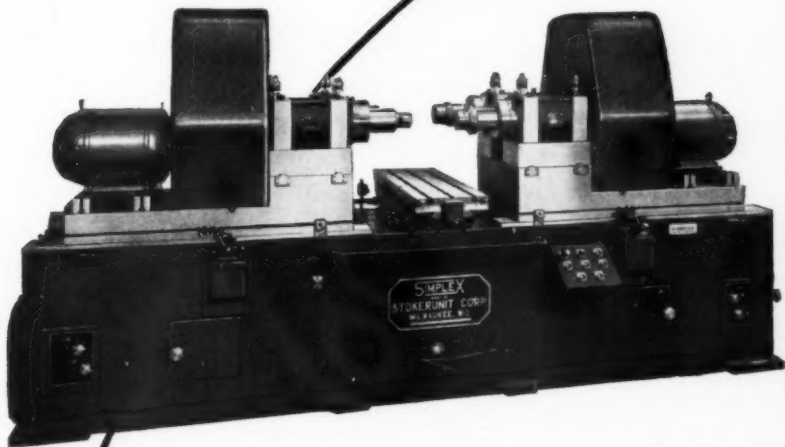
Fig. 10—Horizontal angular bends provided by press bending.

ponents but we must give thought also to "formed" type components which are required frequently in weldments. Several methods are in general use for forming components for weldments. One of these is press bending, to make horizontal angular bends as are shown in Fig. 10.

Definite reasons for forming operations such as bending or flueing have been evolved. One is lower cost, for angular bends eliminate one or more welded joints. The cost of bending seldom equals that of the alternative assembly and welding. Careful examination of the design proportions of metal sections might show the economy of using the same metal thickness of web and flange to utilize the advantage of a bent section. A bent component naturally is more rigid than a flat one. This

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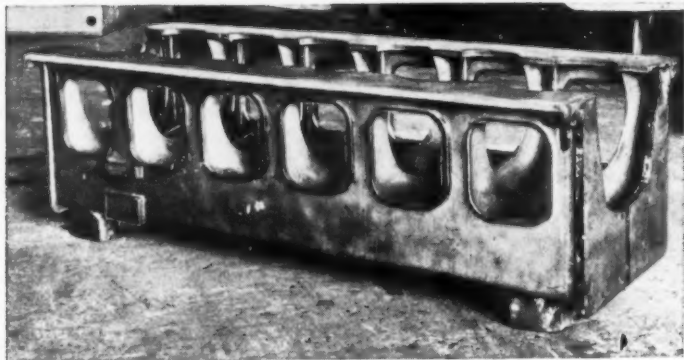


Fig. 11—Weldment showing utilization of flued opening.

can be important in the control of shrinkage and warpage.

Another method, often of value in components, is the specialized forming operation known as flueing, shown in Fig. 11. These flued openings when ma-

chined, provide formed seats for covers. Generally, such a cover is designed to be fastened by an inner clamp as shown at the left in Fig. 12. Treatment permitted by the flued opening eliminates assembly, welding and consequent

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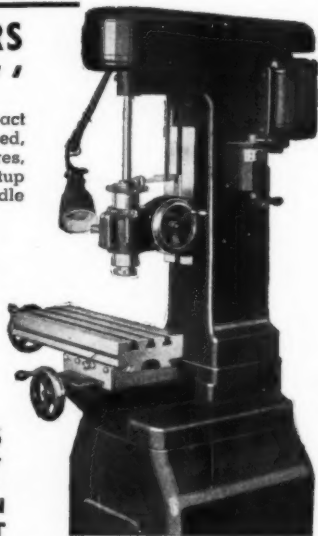
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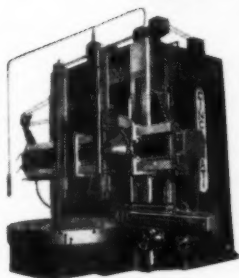


# CINCINNATI

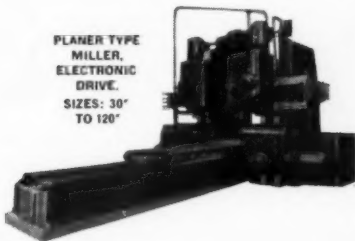
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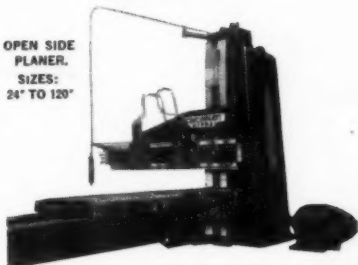
VERTICAL  
BORING  
MILL.  
SIZES:  
54" TO 12"



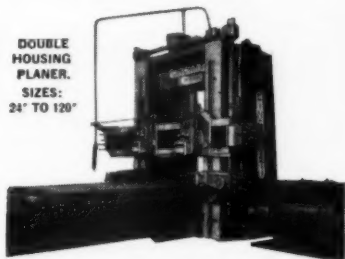
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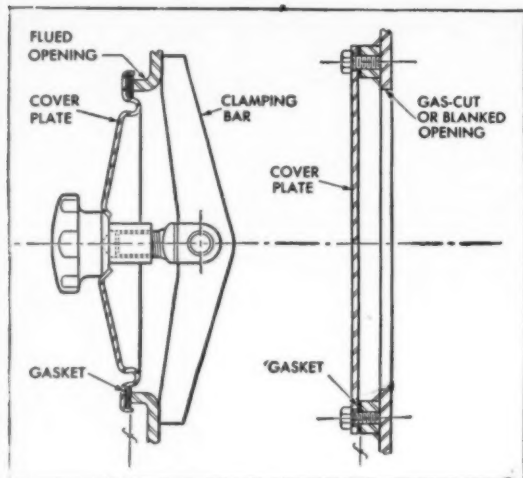


Fig. 12—Formed seat cover designed to be fastened by an inner clamp at left. Assembly, welding and consequent warpage, and the cost of drilled and tapped holes are eliminated at right.

warpage, and the cost of many drilled and tapped holes as shown at the right

in Fig. 12. In addition, weight reduction is achieved.



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Fig. 13—Melting pot using flanged components to advantage in weldments.

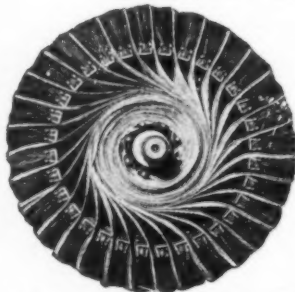
Another function of flued openings in weldments is to provide stiffening lips, which are executed normally by welding a band around the opening where required by design considerations.

Since dies are necessary, flued openings are unwarranted economically, unless the quantity of openings justifies their use. When flued openings are being considered, the designer should consult the supplier for it is possible that dies exist which can be adapted.

Products of the flanging or spinning machines often are utilized to advantage in weldments, as their applications in the melting pots in Fig. 13 show. The bottom corners of the pot in the lower illustration are composed of a flanged head split in half, with one-half serving for each corner.

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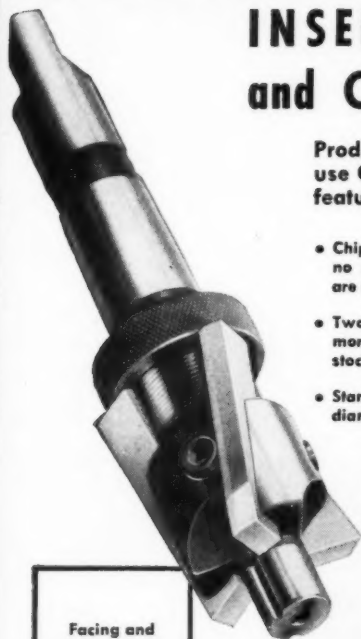
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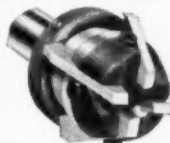
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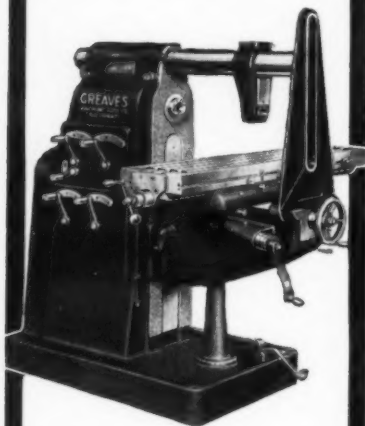
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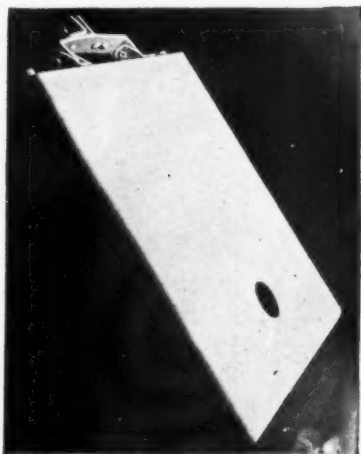
Fig. 14—Corner stamping for water cooled furnace door.

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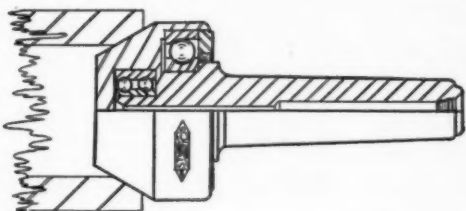
Fig. 15—Type of door showing construction using component shown in Fig. 14.





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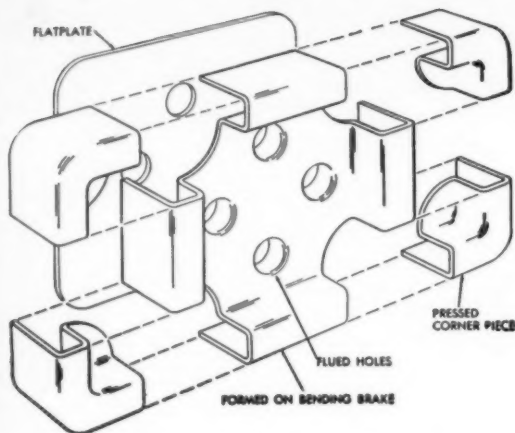


Fig. 16—Exploded view of the water cooled furnace door, showing construction.

used advantageously. Fig. 14 shows a small stamping and Fig. 15 shows the weldment in which four of these stampings form the corners of the piece.

Forming, required on the remaining components, is done on a press brake. Fig. 16 shows the relation of the various components in this weldment.

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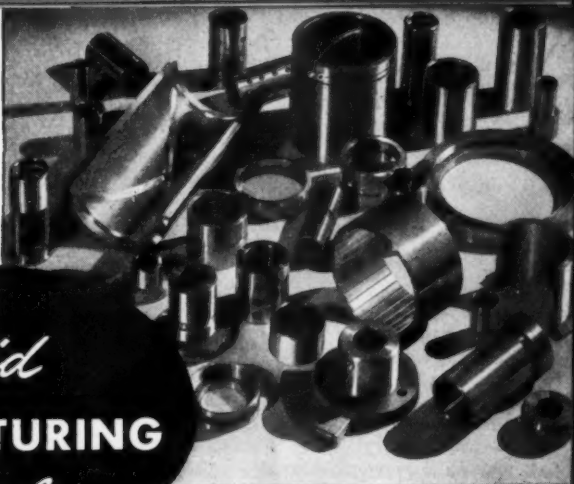
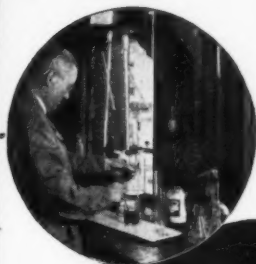


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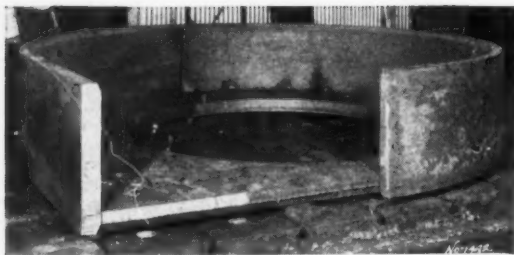


Fig. 17—Plates, 4" thick, formed on the bending roll.

A useful method of shaping cylindrical contours is provided by bending rolls. A component formed in such a manner is shown in Fig. 17. This component is seen readily in the finished weldment shown in Fig. 18.

### Shapes

At times, shapes formed on a rolling mill may be used justifiably in weldments. Their value as components results from two factors: a reduction in cost because of elimination of welding, and initial rigidity which can tend to simplify fabrication problems of shrinkage and warpage. In considering the use of structural rolled shapes, the tolerances possible in such rolling mill products should be studied carefully for they may affect adversely the design requirements.

Steel castings are used extensively as components in weldments where economy in producing complicated

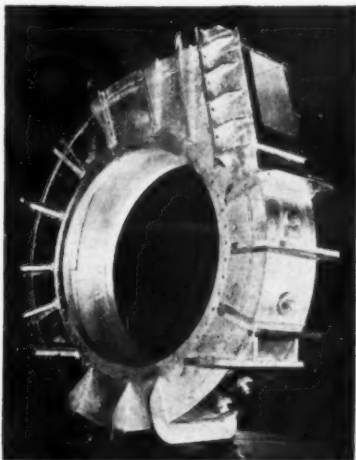


Fig. 18—Pump casing, utilizing components shown in Fig. 17.

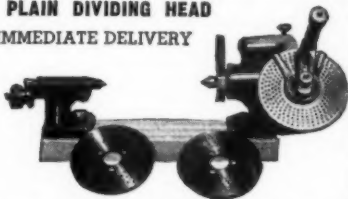
shape requirements or special contours at given points in a particular assembly are involved.

Jefferson  
5-Tool Tail-  
Stock Turret

Shipment  
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### 6" PLAIN DIVIDING HEAD IMMEDIATE DELIVERY



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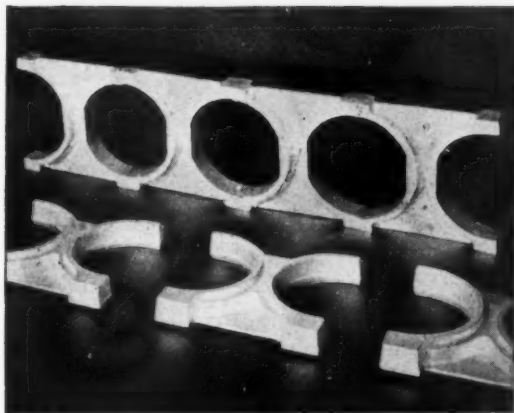


Fig. 19—Typical use of drop-forging and flash-welding to provide components of irregular shape and difficult proportions.

When castings are to be used in weldments, their physical and chemical properties should be specified carefully. Also, where size permits, it is desirable to have castings of electric furnace steel which seems to possess greater cleanliness. This is important in obtaining good welds with minimum difficulty.

Drop forgings also may be used when their size and quantity justify the investment in dies. This product has good homogeneous properties and, when properly controlled, its tolerances are close. Fig. 19 shows such application where a number of drop forgings have been joined by flashwelding.

• • •

#### Editors Note:

The constant increase in the use of various methods of fabrication practiced in the machinery industry should make George Snyder's article, "Design Considerations for Welded Machinery Parts", of real interest. Although the article has appeared elsewhere in trade journals, recent inquiries to the MACHINE TOOL BLUE BOOK indicate that the information contained therein has not reached many of our readers.

We wish to thank the Lukens Steel

Co., and Mr. Snyder for their kind cooperation in allowing us to publish this article, and for the use of the many photographs used as illustrations.

Part two of Mr. Snyder's "Design Considerations for Welded Machinery Parts" will appear in the next issue of Machine Tool Blue Book.

#### PRICE REDUCTION

On Aug. 1 the BMC Manufacturing Corp., Binghamton, N. Y., announced a drastic price reduction on its widely selling No. 7 and No. 9 Precision Pressure Lock Wrenches. Mr. R. R. Poynter, General Manager of Standard Mfg. & Sales Co., Lebanon, Indiana, was so perturbed that he wrote BMC, "this has been such a shock to me that I must write and tell you just what I think of it."

Continuing, Mr. Poynter asserted that it has been his opinion all along that all this country needs to lick inflation and restore good times is plenty of production of quality merchandise.

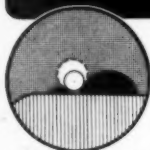
"This is the first price reduction we have received in quite a few years as most of them are increases of 30 to 40 per cent." In closing his letter, Mr. Poynter stated, "I know there will be other companies following the same procedure when the time comes that their product is in production and they are securing quality materials for their production."



## Fast Precision Lapping the CENTERLESS WAY

### IT'S FAST

Cylindrical piece is placed between rolls as shown. Small roll turns piece at slow constant rate. Lapping compound is applied to large roll which turns rapidly to remove minute quantities of metal. Convenient groove on either side of rolls, also shown, expedites feeding and removal of parts.



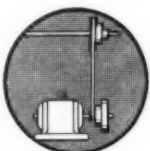
Handles .010" to 10" diam.



Convenient Feeding Groove



Handy Coolant Tray



Easy Speed Change

### IT'S ACCURATE

Obtain precision finishes of less than 2 micro-inches. Regular compound, diamond lapping compound, and micro-compound are available depending on degree of finish wanted and material being lapped. Convenient coolant tray in top, as shown, is provided for cooling parts after lapping before checking on comparator.

### IT'S ECONOMICAL

Gives extreme accuracy with minimum operational skill. Operator merely holds part between rolls with stick — pressure determines quantity of metal removed. No costly set-up time . . . no special tools. Handles any diameter from .010" to 10" with only quick, easy adjustment of roller spacing. Roll speed easily changed. Also adjustable for tapers.

- Gives Precision of Less Than 2 Micro-Inches.
- Handles From .010"-10" Diameter Cylindrical Pieces.
- Eliminates Time-Wasting, Costly Set-Ups.
- Requires No Specialized Operating Skill.

Set new standards for precision in finishing cylindrical parts in your shop—replace slow, inaccurate, costly operations with the new Size Control Centerless Lapping Machine. Use it for lapping oversize gages, worn gage plugs to next smaller size, bearings, bushings or shafts. Unit is complete ready to operate—send for Catalog 47 for complete specifications.

### 2 GAGES IN 1 . . . WITH PLUGS THAT REVERSE FOR 6-FOLD SERVICE



Size Control Reversible Plug Gages have a "GO" and a "NO-GO" end—conveniently marked in green and red. Reversible plug ends have gaging surface over entire length—quickly reverse in patented pin-vise handle when wear occurs . . . tips can be cut off for addi-



tional service. Handle holds plugs securely . . . permits adjustment of plug end length. Complete range of sizes from .010" to 10.000" with plain or threaded plugs. Send for Size Control Catalog No. 47 for complete listing of these and many other type gages.

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Precision Inspection Equipment

## PRECISION MEASUREMENT



By  
**WARREN  
BAKER**

### Section 1 — Inspection Instruments (Continued)

#### Part 5 — Mechanical Comparators

**T**HERE are three general types of comparators that can be classed as mechanical ones. The air actuated, a relatively new development in the field which has won wide acceptance for a rather limited group of uses. The rack and pinion or lever actuated comparator, which was one of the first on the market and which is still widely used, and the reed actuated mechanical comparator, which is capable of considerably closer measurements than either of the others.

The comparator, as the name implies, is an instrument that compares a dimension with a known standard or "zero" set up on the device by the operator. Deviations from the standard

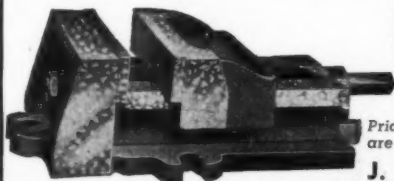
or "zero" dimension are shown on a scale which, in the cases of the three instruments considered in this installment, may be either a dial, an arc, a flat scale, or a liquid level in a tube.

The mechanical comparators, save the reed type, are incapable of measuring accurately to less than a hundred-thousandth of an inch (0.00001"). Therefore their application is limited largely to production inspection and to laboratory use in plants where tool inspection tolerances will never go higher than a hundred-thousandth.

#### The Air Comparator

The air comparator, one of which is shown in Fig. 1. depends in its opera-

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Setting up a dimension with gage blocks on a mechanical comparator. (Courtesy the DoAll Co.)

tion on pressures or back pressures engendered when a stream of air meets an obstruction. It has no adjustable

zero. Each dimension must be set up on the instrument by using a special head designed and calibrated to that dimen-

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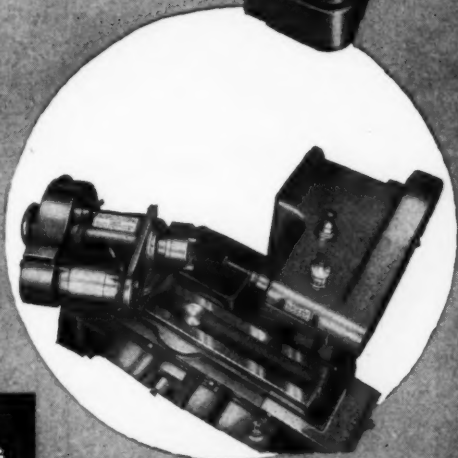
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Work Capacity—3" Dia. x 10" Length  
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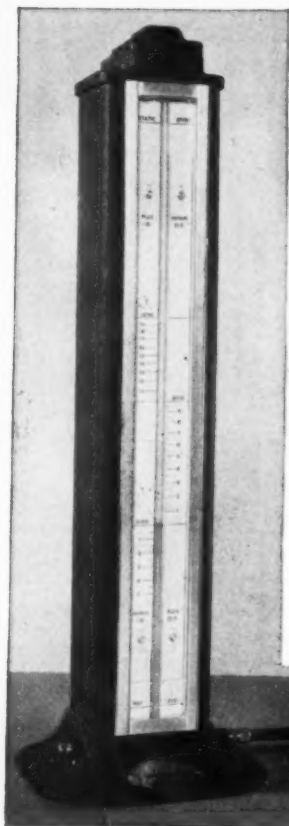


Fig. 1—A typical air actuated comparator fitted with an internal gaging head. (Courtesy Federal Products Corp., Providence, R. I.)

sion. However, both inside and outside dimensions may be measured by such instruments, most manufacturers making heads for either purposes. One



Fig. 2—Gaging heads of various sizes and for internal and external measurement are available from air comparator manufacturers.

such measuring head is shown in Fig. 2.

Heads for internal measurements look much like plug gages usually with three, sometimes only two, channels cut longitudinally into the "measuring" surfaces. Actually, the outside surface of the "plug" is not the measuring sur-



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Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

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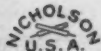
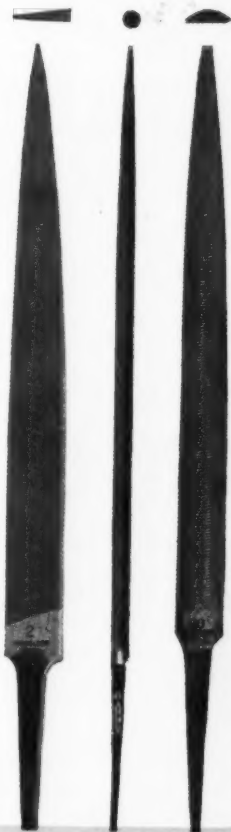
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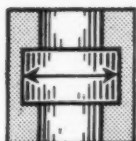
The Clipper No. 9 Portable Lacer laces belts up to 6 inches wide in one quick, easy operation. Under powerful pressure hook legs are embedded flush with the surface of the belt and points clinched, making a perfect joint. Phone your mill supply jobber for a demonstration!



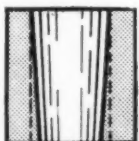
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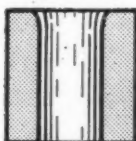
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LARGER INTERNAL DIAMETER



TAPER



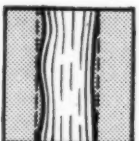
BELLMOUTH



CROOKED



INTERNAL DIMENSION



IRREGULAR



RIFLING DIAMETER

Fig. 3—Types of internal aberrations and inspections easily found and made with air comparator. (Courtesy Federal Products Corp.)

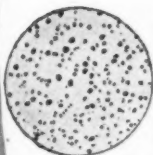
face at all, because the streams of air are shot from orifices sunk into the channels. The distance from the air orifice to the surface of the object being measured with an internal comparator, this would be the internal diameter of the object. This determines the measurement shown on the dial or tube provided the pressure is equal on all sides. It will be obvious, then, that the



# Le Blond flame-hardened lathe bed ways

assure longer sustained accuracy!

THE RIGHT STEEL + LeBLOND FLAME-HARDENING PROCESS + COMPLETE STRESS-RELIEVING DRAW = LONGER SERVICE LIFE.



*friction  
reducing*

Graphite distribution of graphitic type steel used exclusively on all LeBlond flame hardened ways.

The graphitic type steel used in LeBlond flame hardened bed ways has qualities and properties equivalent to those of a high grade tool steel. The microscopic graphitic pockets, uniformly distributed throughout its structure, absorb oil, facilitating lubrication and greatly reducing friction and wear. The lubricant retained in the graphite receptacles makes carriage movement easy and accounts for the remarkable service life of the shears.

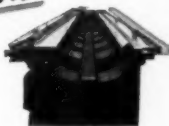
*complete*

After flame hardening, a stress-relieving draw is given all LeBlond bed ways to relieve the stresses set up by the hardening process. These shears test 63-66 Rockwell C (over 600 Brinell). They will outlast the useful life of the lathes. In addition, the LeBlond compensating vee-way principle is retained, supporting the carriage at a right angle to the thrust of the tools.



Cross section view. Note the uniform structure of the soft metal core, the generous depth of the hardened outer case.

*replaceable*



LeBlond flame hardened bed sections are joined to the bed by means of screws at intervals of six inches. It is easy to remove and replace them in the event of accidental damage.



THE R. K.

## LeBLOND

*standard equipment*

LeBlond flame-hardened and ground shears are furnished as standard equipment on both front and rear ways of all heavy duty engine lathes up to and including the 32" size, on all tool room lathes, and on all hollow spindle (oil country) lathes.

In addition to the bed ways, many other LeBlond lathe parts which are subject to wear are also flame-hardened. For example, on the 25" heavy duty engine lathe, 13 separate parts . . . shafts, gears, pinions, and bars . . . are flame-hardened by the LeBlond process for greater sustained accuracy and longer life.

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MACHINE TOOL CO., CINCINNATI 4, OHIO

LARGEST MANUFACTURER OF A COMPLETE LINE OF LATHES

air orifices must be equal in diameter and that the air pressure at the orifices also must be equal always or no accuracy can be established or maintained.

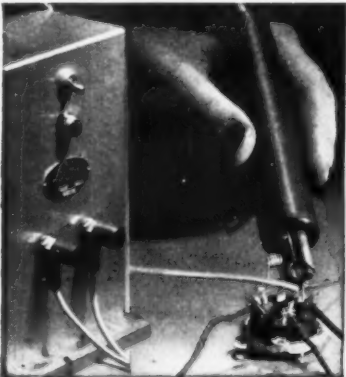
Such a comparator finds wide acceptance in production inspection because of its simplicity and the speed with which it may be used to inspect a continuing flow of products all supposed to be the same size, within, of course, the production tolerances. It also is used quite often in inspection laboratories where a large number of such instruments as ring gages, for instance, must be inspected daily or, perhaps, at even shorter intervals. It may also be used to determine a wide variety of aberrations in holes, such as are shown in Fig. 3.

The external heads operate on the same principle, streams of air being shot from orifices sunk below the actual gaging surfaces of the instruments. Such applications find use in inspection laboratories

where many tools, such as plug gages for instance, must be inspected daily.

It was said a moment ago that such instruments have no "zero" save that afforded by the various head attachments. This is not strictly true, tho it is true for most practical applications in the inspection laboratory. Some adjustment of the zero is afforded by slipping the scales on the indicator tubes of the instruments, as is visible in Fig. 1. It is also possible to regulate the

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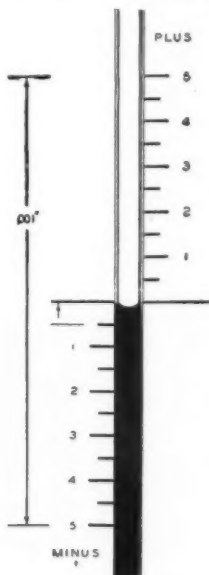


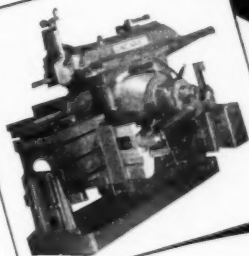
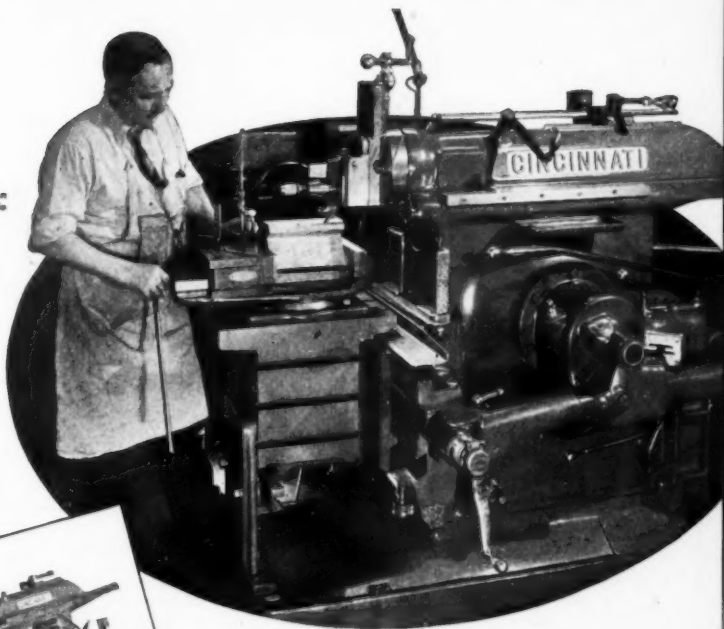
Fig. 4—Half size reproduction of an air comparator scale. (Courtesy Federal Products Corp.)

level of the liquid in the tube to compensate for evaporation or other loss.

Most air comparators measure directly in "tenths" but, because of the size of the indicating tube, shown one half actual size in Fig. 4, hundredths of a thousandth of an inch may be estimated with fair accuracy.

# ACCURACY FIRST...

Courtesy of  
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Dayton, Ohio



Accuracy is the first requirement where fine tools and gauges are built—their whole value lies in their accuracy.

In their production fine machines are needed for only fine machines can produce fine tools.

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### Gear and Lever Types

The rack and pinion actuated comparator operates on the same principle as the dial gage with which every inspector, production or tool, has been familiar for years. These may also be actuated by levers, and sometimes may be a combination of a gear train with levers. The best of these have adjustable zeroes and are equipped with accurate anvils to which gage blocks can be wrung to set up the "zero" dimension. The instruments are in most cases, widely adjustable as to capacity.

The instrument shown in Fig. 5, for instance, has graduations each of which reads 0.00005", has a total plus or minus range of 0.0015" and a maximum capacity of 3 3/4". Other models are available from various makers with even greater capacities.

A fine or zero adjustment is always

Fig. 5—A typical mechanical comparator, reading in half a "tenth" per graduation. (Courtesy Federal Products Corp.)



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## **THROATLESS SHEARS**

**CUTS ANY SHAPE**  
**CUTS ANY SIZE**  
**CAPACITY UP TO 1/4" STOCK**

Here's the shear that offers best performance features. Cutting speed 6' per minute. High grade tool steel cutters. Write today for details. Prompt shipment.

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# Save Time

## ON SHORT RUN MILLING OPERATIONS

by tooling your work on a

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... SIMPLE ... FAST ... ACCURATE

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Simplicity of operation, high spindle speeds and precision are built-in Gorton characteristics which enjoy enthusiastic approval among thousands of Gorton users throughout the world. It will pay you to investigate Gorton Tracer Control now.

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Send us complete description with prints of one of your jobs. Our Engineering Department will send you a production estimate on the same job tooled on Gorton tracer controlled equipment—no obligation.

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Bulletin No. 1633 will give you complete information on all Gorton tracer controlled machines ... what they are ... what they do ... how they operate. It's yours for the asking.



#### JOB FACTS

- 1 NAME OF PART—Packaging Machine Cover
- 2 MATERIAL—Cast Iron
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- 4 OPERATION—Mill Gasket Groove—10 in lot
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GEORGE **GORTON** MACHINE CO.  
TRACER CONTROLLED MILLING

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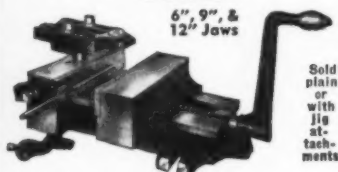
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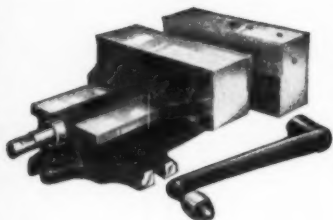


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As a plain vise, this tool has flush, parallel, square construction, a great aid to accurate positioning. As a jig or fixture, its numerous stops, guides, special jaws, etc., permit accurate repeat-operation work. Sizes up to 124 lbs.

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Fig. 6—The Sheffield reed-actuated comparator. (Courtesy The Sheffield Corp., Dayton, O.)

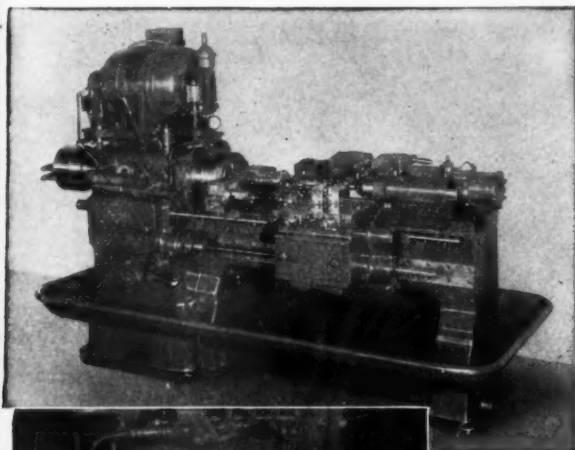
provided to take up any slack or wear in the rack and pinion or lever mechanism on such instruments as are capable of measuring in hundred-thousandths of an inch. These instruments, of course, are the only ones in which the true precision laboratory is interested. The mechanical dial comparators, however, like the air actuated, find wide favor for production work and for those laboratories where high magnifications are not required.

### **The Reed Comparators**

The reed actuated mechanisms as used in the Sheffield comparators (Fig. 6) provides the user with almost trouble-free instruments having long life, and the high amplifications necessary for inspection laboratory applications. While the mechanism, once assembled, is rather simple, as shown in detail in Fig. 7, no attempts at repair-

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



## Lo-swing AUTOMATIC LATHE

*incorporates unique features  
for cam-shaft job and*

### Reduces the Number Operations Required

**Problem:** To perform the following operations on a 6-cylinder cam-shaft: Cut double eccentric oil groove; head bearing; rough and finish turn small bearing; chamfer small bearing; face and chamfer oil pump drive gear.

**Solution:** A 5x34" model "LR" Lo-swing Lathe was selected for this job. It was equipped with a standard

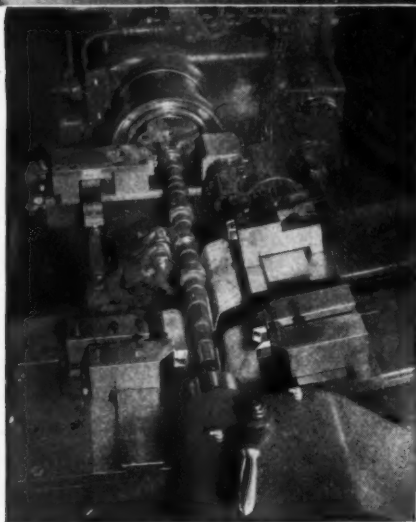
slide carriage, 2 back squaring attachments, front steady rest, a double eccentric grooving attachment and an automatic 2-speed headstock. This 2-speed headstock and automatic control are one of the unique features of the tooling for this particular job. Since cemented carbide tools were used, high speeds were essential for finish turning and squaring operations, yet were impractical for the double eccentric grooving operation. The lathe automatically shifts from high speed upon completion of turning and squaring operations, and goes into low speed for the double eccentric grooving operation.

The cam roller on the double eccentric grooving attachment is automatically withdrawn from the cam path during the high speed portion of the cycle.

Another interesting feature of this lathe is the 2-slide carriage which accomplishes both roughing and finishing cuts on the small bearing. The roughing tool on the front slide relieves from the work before the tool on the second slide moves in for the finish cut.

Consult our Engineering Department for time-saving equipment.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.



# LATHE NEWS from SENECA FALLS

THE PRINCIPLE  
OF  
THE REED  
MECHANISM

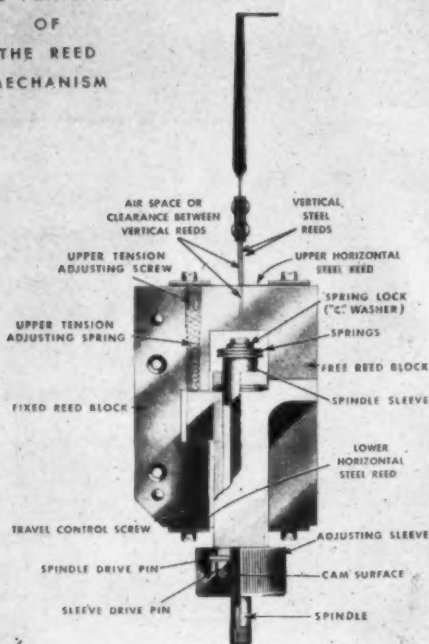


Fig. 7—The reed mechanism in detail. (Courtesy The Sheffield Corp.)

ing it should be made in the ordinary shop. There are no bearings, rack, gears, or knife edges to wear and, given ordinary careful treatment will maintain high accuracy for years.

The maker asserts the reed mechanism is the simplest mechanical device ever developed for measuring slight movements. It consists, as will be seen from Fig. 7, of two metal blocks, one

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Fast, Accurate  
Metal-Cutting  
Use*

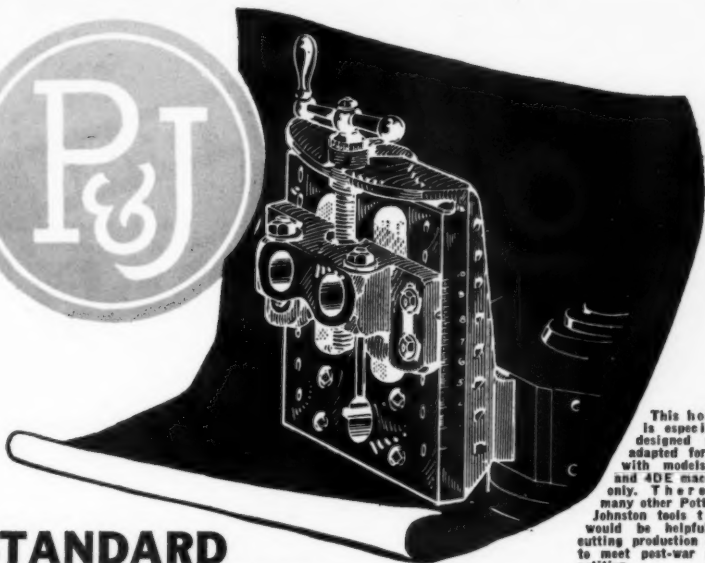
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TOOLS, BLANKS, and MILLING CUTTERS

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LATROBE, PA.

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Recedes back into handle when not in use.  
Hardened Steel Replaceable Points — Also —  
Hardened Steel Knife Blade Included in Unit—  
Send \$2.00 Complete. Carbide Tips \$1.00 additional.  
(WEIGHT—LESS THAN ONE OUNCE)  
AGENTS WANTED  
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This holder is especially designed and adapted for use with models 4D and 4DE machines only. There are many other Potter & Johnston tools that would be helpful in cutting production costs to meet post-war competition.

## STANDARD ADJUSTABLE TURNING TOOL HOLDER

This adjustable tool holder will carry two Stems, either for turning or boring cuts, and in addition, a boring bar or drill may be carried in the center hole. The cutters are quickly set to the required diameters by moving the adjustable block up or down. The side scale and the micrometer dial under the ball crank contribute to quick and accurate settings which may be changed easily with the job. Two locking screws on either side of the block fix it solidly in the location desired. The adjustment range of the Stem holes is from 4 to 10" from the rotation center.

If you use Potter & Johnston machines in your plant, it will pay you to let us send you a copy of this catalog on modern tooling. It illustrates and describes a broad range of up-to-the-minute production tools.



*The* **POTTER & JOHNSTON**  
**MACHINE CO. PAWTUCKET, RHODE ISLAND**



Fig. 8—A horizontal external comparator of the reed type. (Courtesy The D o A L L Company, Des Plaines, Ill.)

# GUN DRILLS

FOR DEEP-HOLE DRILLING  
WITH H. S. S. OR CARBOLOY TIPS.  
INQUIRIES SHOULD STATE DIAM-  
ETER, OVER-ALL LENGTH, SIZE  
AND STYLE OF ADAPTOR.

**CONNER**  
TOOL & CUTTER COMPANY  
5555 Conner Ave., Detroit 13, Mich.

firmly anchored to the gaging head case and the other, the free reed block floating from the fixed block on two horizontal metal reeds. The floating block carries the spindle. Besides the horizontal reeds, a vertical reed is attached to the inner side at the top of each block. The junction of the vertical reeds forms an arm to which is fastened a wand.

As the spindle and the gaging block are moved upward by pressure from the part or instrument under inspection, the horizontal reeds deflect, while the vertical reeds, which cannot slip, swing in an arc. As applied to the Sheffield instrument, (Fig. 7) the pointer is actually a "target arm" which interrupts a light beam, casting a shadow on the scale. Amplifications from 500 to 20,000 to 1 are available simply by varying vertical reed and target-arm lengths. There is also some amplification provided by the light shadow, but otherwise the action of the instrument is entirely mechanical.

*The*

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Proves its worth in time saving alone. Its powerful grip . . . speedy release . . . one hand operation and rugged strength quickly and satisfactorily handles many milling operations.

The construction of the movable jaw on the Hartford Milling Vise with its ground fitting surface makes it possible to hold single pieces at either end without distortion . . . and is especially adaptable for small arms or small part milling. This thoroughly modern vise merits your investigation. Write today for full details.

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**HARTFORD 5, CONN.**

Altho quite sensitive, the mechanism is rugged. It requires more than half a ton of pressure or shock to break the reeds, and instruments of this type have been recorded as doing more than 100 million gaging operations without appreciable wear except at the diamond point of the spindle itself. The use of the shadow indicator makes it possible to read such instruments accurately at any angle from which the scales can be seen.

The gaging head moves on a vertical rack, allowing many different capacities as to work size. Once the working range has been set up by sliding the gage head on this rack, fine zero adjustment is made by means of a large knurled adjusting sleeve above the spindle. A "superfine" zero setting is obtainable by turning the shaft of the spindle itself.

The gaging head swivels in a full circle around the base, making possible

its use on a surface plate over a working circle 10-3/16" in diameter.

### Amplifications

Six models are offered in the regular line giving the following amplifications and dimensions per graduation:— Amplification of 500 to 1 giving readings of 0.0001" per graduation; amplification of 1,000 to 1 gives the same reading per graduation, the graduations being twice as wide; amplification of 2,000 to 1 gives a reading of 0.00005" per graduation; amplification of 5,000 to 1 reads 0.000025" per graduation; and amplification of 10,000 to 1 reads 0.000010" per graduation.

In addition, special laboratory type instruments are made with an amplification of 20,000 to 1, the scale of which has a total range of 0.00025" in 5" of length, with major graduations of 0.000002". The vertical capacity of this model is 4 3/8". This model has the diamond point spindle mentioned before.



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RECORD FOR TODAY'S  
QUALITY DEMAND!**

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Over 75 types and sizes.  
Spur, worm and combinations.  
1/50 to 417 h.p.  
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### Bulletin No. 41

tells how  
straight knurls  
cut many  
patterns



On work up to 2 1/2" dia. this tool adjusts straight knurls to produce varied straight, spiral or checkered patterns.

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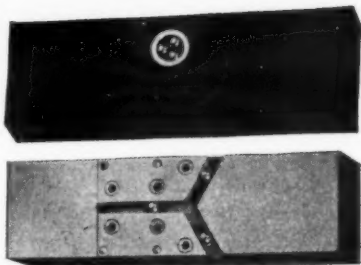


Fig. 9—Two types of three-ball anvils for the high-magnification comparator. (Courtesy the DoAll Co.)

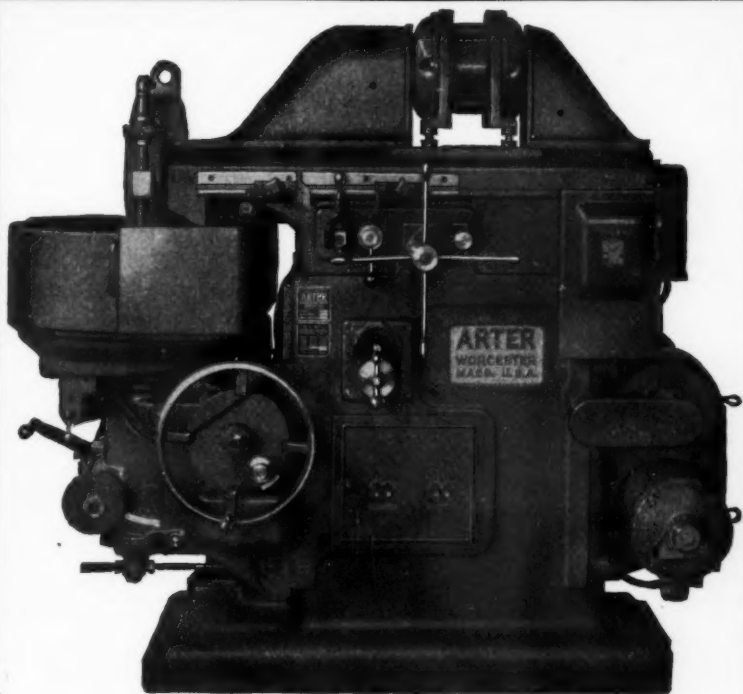
In addition to those already detailed, various special models are available for all sorts of special purposes, some with large capacities for large work. In most cases, however, these are intended for production inspection uses. Models also are available with the scale set in an arc below the gaging head, so that they read from above. Accessories to gage internal measurements are offered and instruments are in use in many plants that do internal and external gaging on a horizontal platform instead of on a vertical anvil-spindle setup. One such is shown in Fig. 8.

#### Operation and Use of Anvil Type

In all cases (except with the air actuated types) the method of using the mechanical comparator is the same. The desired dimension is wrung up with gage blocks and placed on the comparator anvil. The spindle is then brought down to the top of the gage block stack and adjusted to zero at that point.

Then the work is passed under to spindle and any deviation from the standard dimension shows as a plus or minus reading on the scale or dial.

In using instruments with high magnification, as will ordinarily be the case in inspection laboratories, considerable care must be used to wring the gage block stack to the anvil in setting up



## **ARTER** Model D 12" and 16" Rotary Surface Grinders

Improvements and refinements that insure work being ground to extreme precision and high finish—are outstanding features of this grinder held back by war restrictions but now available. ARTER engineers will be glad to analyze your products and point out to you how this grinder can meet the most exacting requirements of your own surface grinding.

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- 4 Adjustment for boring made in increments of one-tenth.
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Slide Travel 1"  
Boring Capacity 8".

**MODEL "H-D"**  
3 sizes of slide travel 2-1/2", 3-1/2", 4-1/2"  
Boring Capacity 26".



## CHANDLER TOOL Co.

514 OHIO AVE., MUNCIE, IND.

the original dimension. Serrated anvils have of late, come into general use in most shops and in some laboratories. The advantage of this style anvil is that it tends to be self-cleaning. However, serrated anvils will not take as good wrings as the flat types. For very fine measurements anvils with a three-ball gaging point such as those shown in Fig. 9 are recommended. Then wring can be disregarded. Where wring is not considered, however, there should be some means of accurately regulating measuring pressures. This matter will however, be gone into in greater detail, in Section II, when study is made of the calibration and inspection of comparators.

(The next installment will describe the electrical and optical types of comparators.)

### LOCK WRENCH

This is a new locking hand-wrench which is said to have a gripping strength equivalent to one ton pressure. The double lever or toggle action of this wrench permits it to be used as a combination straight, end or pipe wrench,



wise, toggle press, clamp or pliers, according to the manufacturer.

Parts up to any size which will fit the maximum jaw opening of 1 1/4 inches, can be held by the wrench for tooling, drilling, grinding or machining, without slipping or changing position, it is said. The wrench is 10 inches long.

Its use as a clamp on such operations as welding and soldering, pattern making, etc. and its general usefulness in removing stubborn bolts, cotter pins and wire bending or splicing operations should prove it to be a handy tool.

Information will be sent by the manufacturers, A. C. E. Inc., Dept. BB, Transportation Bldg., Detroit 26, Mich.





## Just a **TAP** of the finger !

• That's all it takes to obtain any one of 12 spindle speeds on a Gisholt Turret Lathe . . . instantly . . . without releasing the main drive clutch . . . without even stopping the spindle. With the Gisholt Hydraulic Speed Selector you eliminate all manual gear shifting—put an end to needless effort and waste time between cuts.

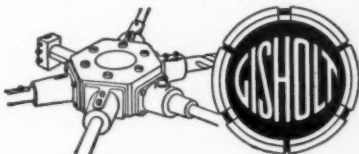
It is particularly effective where parts require turning a number of diameters. You set up the job, determine the ideal machining speed for each cut, and pre-set the speed selector with reference to the diameter of the work. Then you have merely to touch the trip for each successive speed change. There's no effort to it. The speed selector is power-operated.

Or, you can use the speed selector "direct"—by simply turning the control wheel to obtain any desired spindle speed without intermediate stops.

However you use it, it saves time, speeds up production, cuts machining costs. Write for literature.

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# The BRISTOL-ROCKWELL DILATOMETER and ALLOY 10

Model A 134 Bristol-Rockwell Dilatometer showing application of Alloy 10 Elements in furnace.

**A**

NOTHER illustration of the expanding use of Hevi Duty Furnaces and Elements in analytical research is that of the application of Alloy 10 elements in the furnace section of the Bristol-Rockwell Dilatometer. The simultaneous recording of temperature-time and temperature-dilation changes of solid form materials by the machine is accomplished at elevated temperatures. Many research and analytical laboratories have standardized on Hevi Duty Furnaces and Elements where temperatures to 2350° F. are required. Bulletins HD-339 and 245 have the details — send for them.

**HEVI DUTY ELECTRIC COMPANY**

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY  
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# Air Power In Machines

By James McMartin\*

**P**EOPLE interested in the design and use of machines for fabricating purposes have long known that air power, although twice as costly as electrical power, can still be used economically in many places and for performing many operations. What they don't generally realize is the extent to which it may be used.

Limitations have generally been placed on air power for the individual or corporate consumer by the limits of available equipment. Most of us are familiar with air motors (for rotating power), air chucks, air vises, and air cylinders which push or pull or both, all of which come in many sizes. But there are numerous variations of motions, forces, strokes, and velocities, which can be readily generated thru air power even tho, at first glance, the motion, the force, the stroke, or the velocity does not appear to "lend itself."

In most such cases, the "unreasonable" force or the "extreme" stroke can be reduced by the application of a little elementary mechanics and the general formula (always obtaining).

**"WORK = FORCE x DISTANCE**, where DISTANCE is the distance thru which the FORCE travels in the direction the FORCE is headed."

Since an air cylinder is virtually a force (on the piston) traveling a given distance (the stroke), the WORK done by the cylinder is the product of the two. We have, then, only to multiply the desired FORCE by the desired DISTANCE to find the WORK required in the device. Having the WORK required, we can choose a cylinder of any bore or any stroke so long as the WORK

• • •

\*Design Engineer, The Fenn Manufacturing Company.

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American Pioneers—Twenty-two years. Give diameter, length and shape of cavity.

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output of the power unit is equivalent to the WORK required.

In another case, where the force desired is a variable, external linkages

**Force In Device=1000 lb. Distance In Device = 2" Work Required = 2000" lb.**

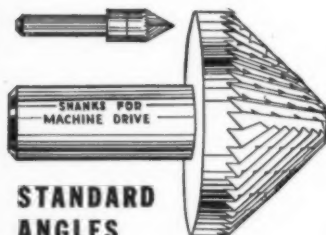
If the maximum FORCE of the cylinder is to be 200 lb, the stroke must be  $2000" \text{lb.} \div 200 \text{ lb.} = 10"$ , neglecting friction, and the mechanical advantage of the wedge must be 5.

Sometimes the use of air is surrendered because of the space required by the cylinder. Remembering the WORK formula above, cylinders can be designed to occupy very little more than the theoretical space required by the bore and stroke. Most manufacturers of cylinders save cost in manufacture and maintenance at the expense of space, since space is not often important. When it is, consider the work formula and its application to a custom-built cylinder.

may be employed, whose mechanical advantage also varies with the stroke such as to deliver the desired variation from a constant force source.

Still another place where limitations may be lifted is in the valve. It is not necessary to operate a double-acting cylinder with a 4-way valve. The "return" stroke may be accomplished with an "air spring" at constant pressure on the rod side of the piston; thus the 4-way valve becomes a 3-way valve which is often easier to operate mechanically. This principle applies whether the "return" stroke actually returns the device or is the working phase of the cycle. One disadvantage of the "air spring" is the fact that, in

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FROM STOCK BLANKS

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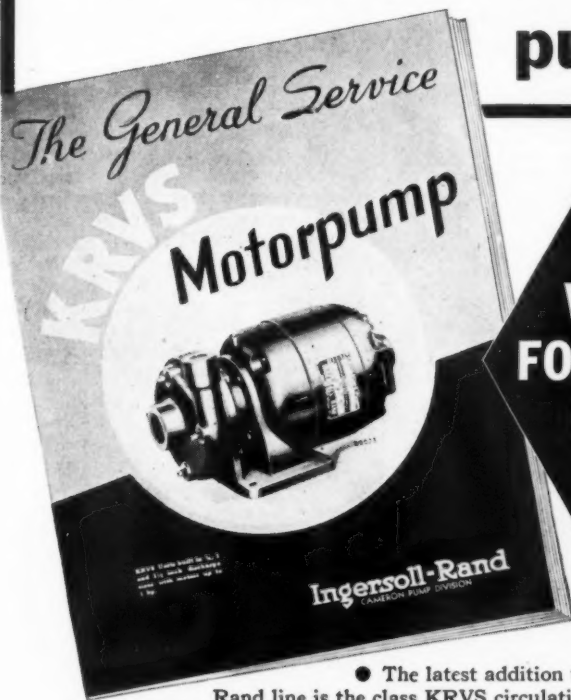
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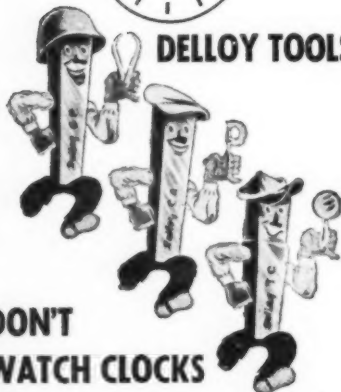
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If you have a problem in turning, boring, planing, or facing, talk it over with the skilled tool designers and metallurgists at Delloy. Also send for new catalog.

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long strokes, it delays the piston "return" if the "return" stroke is throttled. This is because it takes time, when the exhaust is throttled, to reduce the pressure in the blind end of the cylinder enough to compensate for the excess area of the piston, before a potential for piston movement can be set up.

In addition to reducing a 4-way valve to a 3-way valve, a great deal can be done to regulate the behavior of the cylinder by employing the proper valving—throttle valves on either inlet or exhaust air or both, by-pass valves to divert air around throttle valves at certain times, cam actuated shut-off and check valves, flow-control valves, and reducing valves to supply different pressures. This latter field requires considerable study and should be left to the air engineer, but, nevertheless, opens up a great opportunity for applications as yet hardly explored.

We can with a fair degree of assurance, say of a given problem, "Yes, you can do it with air." It is far more difficult to truly say, "No, you can't." The answer is, if you don't know, ask!

### PORTABLE GRINDER

The new Gaston Grinder is a portable instrument that is used for grinding and sanding operations on all gauges of steel and other metals, and is also widely used with brushes for removing paint, rust, etc., according to the manufacturer.

Unlike ordinary grinders, the Gaston Grinder is powered by a three phase motor which is without brushes, commutators or gears. This feature is said to outlast three or four of the brush gear types. The manufacturer stresses the fact that the grinder starts at full speed which remains constant under heavy load to eliminate glazing of the grinding wheel and produce a better ground surface.

Gaston Portable Grinders are of dust-tight construction, and are available in three sizes, 1, 1½ and 2 horsepower. Furnished in either "cup-wheel type" or "edge-wheel type" as desired.

Complete details and prices may be obtained from William H. Howland, Dept. BB, 2533 East 73rd Street, Chicago 49, Ill.

# Radio Loudspeaker Parts Are GARDNER-GROUND *Semi-Automatically!*

"TO OBTAIN BOTH magnetic efficiency, through minimum air gaps at metal joints, and accuracy of parts, to insure perfect alignment in assemblies, the grinding is done on GARDNER GRINDERS" — writes one prominent radio parts manufacturer.

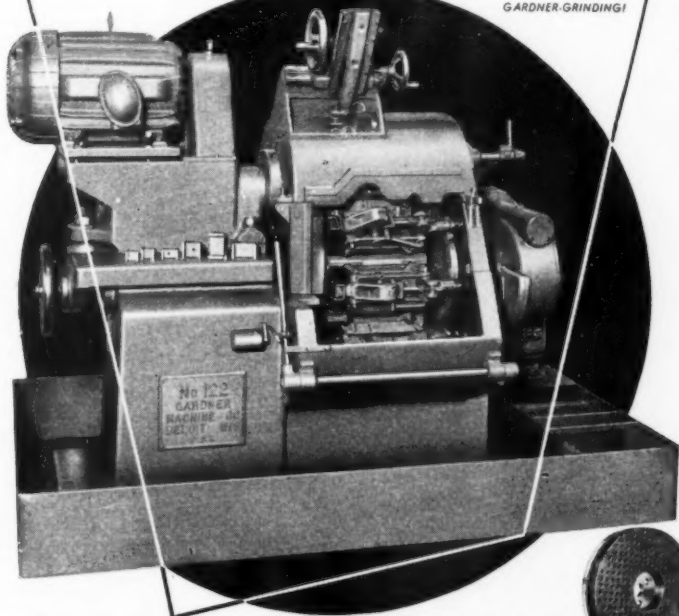
The No. 122-20" Semi-Automatic Gardner Grinder, shown below, removes up to .025" stock from the ends of loudspeaker motor pots at the rate of 8 to 15 pieces per minute, de-

pending on size. Tolerances maintained are .002" for flatness, and .005" for length.

The machine carries an eight-sided drum on which special cam-actuated clamping fixtures are mounted. Drum revolves automatically. Operator merely loads parts into fixtures. Unloading is by gravity.

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Use Modern GARDNER WIRE-LOK Abrasives  
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## DoALL ANNOUNCES NEW INSTRUCTION PROGRAM

Volume I of Instruction Programs, covering the technique of contour sawing has just been announced by the DoAll Company. Primarily intended for use in educational and vocational institutions, this book will also be extremely useful to companies in the instructing of trainees.

The instructional material covers contour sawing and filing in all its aspects, applications, and operational techniques, all phases of sawing and shaping in all types of materials. The book is divided into two sections. One covering conventional, the other high speed sawing procedures, including work projects and tests to be given trainees as well as grading data.

Emphasizing that Contour Sawing is a vocation, The DoAll Company states that use of this instruction program will make better, more valuable operators. It will enable them to recognize sawing applications that might otherwise not be thought of as such. The end result being considerable savings in time, material and manpower.

Four years in preparation, this material is substantially the same as used with

such success by the army and the air corps in its training of DoAll operators.

Volume I of this instructional program is available to companies for use in their training programs as well as to vocational schools and educational institutions. Full particulars can be obtained from The DoAll Co., Dept. BB, 1301 Washington Ave. South, Minneapolis 4, Minn.

## ANGULAR STRAIGHT EDGE

An angular straight edge is a new development of Machine Products Corp., Detroit, builders of surface plates, angles, and other precision measuring equipment.

It is made of heat-treated Meehanite in any size from 18" to 84" in length with any angle specified. Two faces are hand scraped.

This is claimed to be the first ready-built angular straight edge ever marketed on a commercial basis. It was designed especially for machine builders and for machine rebuilding or repair work to simplify the task of scraping and checking of machine ways and slides. It can be used with or without handles at each end. Supplied with felt lined wood case.

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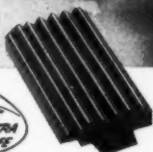
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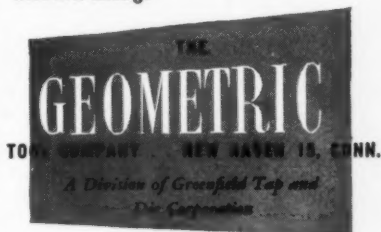
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*If you have in mind a particular threading problem, we will be glad to have our engineers give you their recommendations, based on over a half century of specialization in this field. Why not let us send you the latest Geometric catalog?*



FOR NEARLY EVERY THREADING JOB — A GEOMETRIC!

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ON SMALL PARTS PRODUCTION**



**Ettco-Emrick**  
**SYSTEM**  
for fast, low-cost  
**MULTIPLE DRILLING  
AND TAPPING OF  
Small Parts**

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**Ask for Bulletin No. 31**

Just printed, this bulletin tells the complete story of the versatile Ettco-Emrick System and Equipment that assure maximum production of drilled and tapped holes in small parts, at minimum tooling cost.

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# Letter from England



ROBERT HUTCHESON, Editor  
MACHINE SHOP MAGAZINE (London)

In spite of the number of men and women leaving the fighting services, shortage of labour is holding up engineering production. One of the greatest causes of delay is the bottleneck in the iron foundries where the labour situation is particularly acute. During the war, workers were drawn from the iron foundries for other classes of work. This was because much foundry work was becoming of a repetitive nature for armaments, and women were entering the foundries. Now there is a need for some 20,000 foundrymen and there seems to be little prospect of attracting back the old workers or of attracting newcomers. It is possible that some of the 160,000 Poles who are entering this country under a resettlement scheme will become foundry workers.

Naturally a bottleneck in the foundries makes itself felt in every branch of engineering production and is probably the main cause of a recent reduction in output of the heavier engineering trades including machine tool building. The bottleneck makes itself apparent even farther afield since many non-engineering industries are being retarded for want of new plant equipment, which engineering establishments cannot deliver.

However, in spite of difficulties good progress appears to have been made in the drive for exports. For instance, under the leadership of Sir George Nelson, chairman of the English Electric Co., a party of electrical engineers has visited Moscow to discuss substantial orders for Russia. Also an order for more than £500,000 worth of telephone equipment has been placed by Turkey with the General Electric Co., Ltd., Coventry.

There is a steady demand for British-built machine tools and ancillary equipment. As much as ninety per cent of some machine tool builders' output is destined for export. Substantial orders are in hand for Scandinavia, Switzerland, France, and other European countries, and those British firms that exhibited

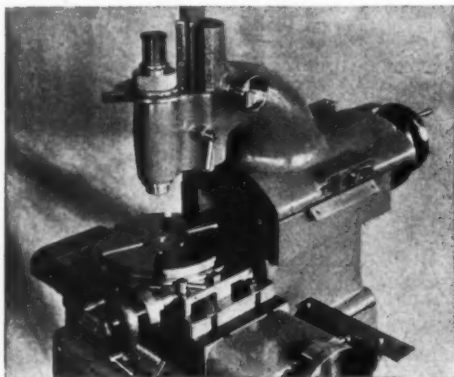
at some of the recent continental trade fairs and exhibitions have had numerous enquiries and orders as a direct result.

Board of Trade returns relating to exports are now available for the earlier months of this year and those for locomotive exports are of interest. Figures issued for January to July of 1946 are given below and compared with those of the equivalent months of last year:

	Jan/Ju: 1945	Jan/Ju: 1946
Number of locomotives	34	245
Tonnage	3,854	22,277
Value	£605,000	£3,709,000

Compared with exports for seven months in 1938 the number of locomotives is about two and a third times as great, while tonnage shows an increase of two and a half times. The value shows a very much sharper increase since the 1938 value stood at £920,000. A very large part of the increase in value is undoubtedly due to the increase in costs that must be faced by locomotive builders in this country.

A glance through the "Situations Vacant" columns of the daily papers and engineering periodicals shows a great demand for all classes of skilled and experienced engineering



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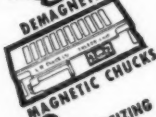
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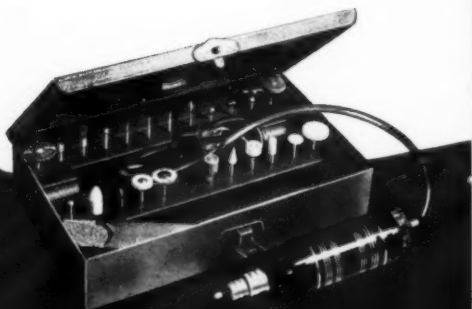
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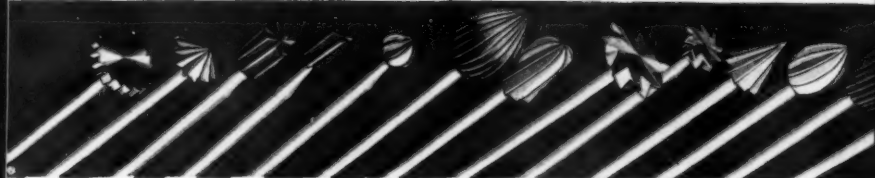


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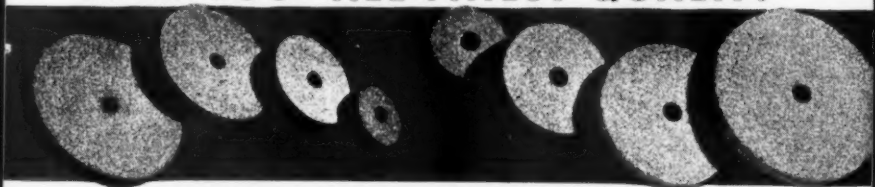
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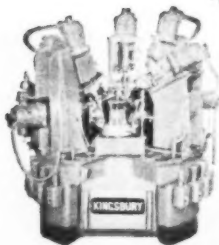
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KINGSBURY FLEXIMATIC

workers. Works managers, draughtsmen and production engineers are wanted, but whereas employers were glad to get men without specific experience during the war years, there is a decided trend today to demand only men who have experience in a particular firm's work. In some parts of the country skilled tool makers are very scarce.

The Appointments Department of the Ministry of Labour is an employment exchange for men and women in managerial, administrative and executive grades and has Regional Offices in all parts of the country that are notified by the head office in London of vacancies for such workers. This service is to be speeded up by the use of a teleprinter service whereby offices in Cambridge, Reading, Bristol, Birmingham, Nottingham, Leeds, Manchester, Liverpool, Newcastle-on-Tyne, Edinburgh, Glasgow, Cardiff and Winchester will receive notices of vacancies by mid-day every day instead of there being a delay of about twenty-four hours before a vacancy notified in London was made known to all the Regional offices.

From September to November the "Britain Can Make It" Exhibition is running in London. This is a Government financed exhibition to show some of the very best of the country's con-

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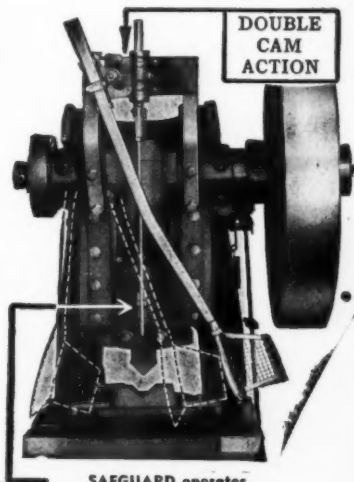
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sumer goods. Good design, both functionally and aesthetically, is the keynote of the exhibition which will cover a wide range of engineer-produced goods as well as textiles, pottery, clothes, etc.

\* \* \*

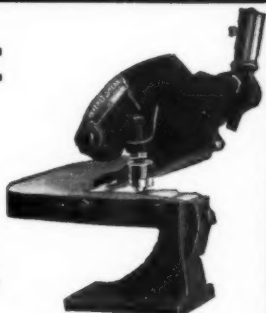
News was recently released to the effect that the British Industries Fair is to be held from 5th to 16th May 1947. The exhibition will, as in previous years, be held in two portions, the light industries section in London and the engineering and hardware section at Castle Bromwich, Birmingham. Many of the products that will be on show will be suitable for export and it is hoped that buyers from overseas will be attracted to the exhibition.

\* \* \*

A delegation from the United States, headed by William L. Batt (Vice-President of the United States War Production Board) is in London to continue the discussions on the unification of screw threads in U.S.A., Canada and Britain. The British Standards Institution, the Ministry of Supply and other responsible bodies are very interested in this international standardization.

On Friday, September 6th, a meeting was held at the Institution of Mechanical Engineers when Mr. Batt was made an Hon-

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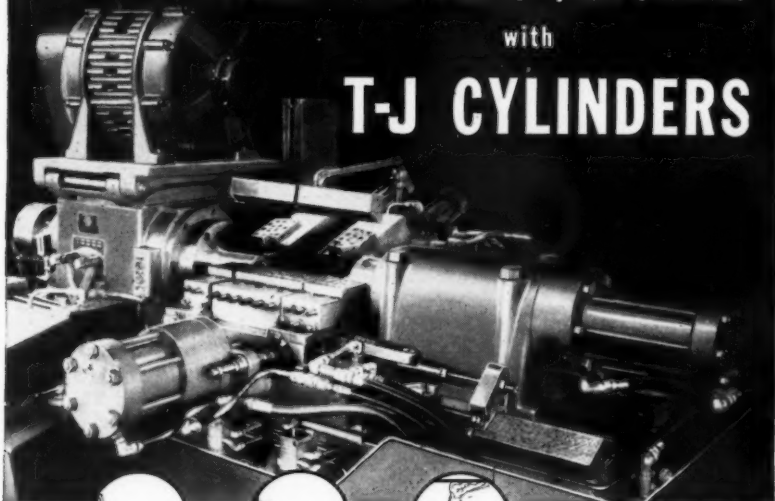
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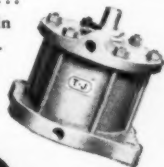
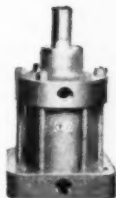


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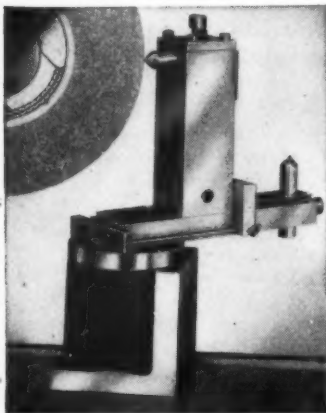
orary Member of the Institution as a token of recognition of the very fine job he did during the war years. At the meeting Mr. Batt gave a most interesting and informative talk on what had already been done in America towards unification of threads and he outlined the advantages, in both peace and war, accruing from such a step. He stressed the point that help and encouragement would be given by the Governments of the three countries involved, but the decision to make the change must come from the engineering industry itself. The new standards must be such as to give the optimum screw thread system with the least upset to an industry using thread standards that are long established.

\* \* \*

The Government's plans to control the iron and steel industry have moved on another step by the appointment of most of the members of the Iron and Steel Board. One of the main purposes of the newly formed Board will be the reviewing and supervising of the development of the industry. The Board will also advise on prices. The Chairman is Sir Archibald Forbes, director of Spillers Ltd., a firm of millers. Other members are: Sir Alan Barlow, Bart., a civil servant who has been joint second secretary of the Treasury for four years; A. Calligan,

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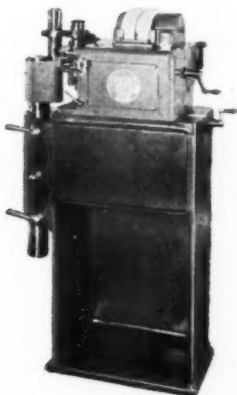
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O.B.E., national president and general secretary of the National Union of Blast Furnacemen; Lincoln Evans, general secretary of the Iron and Steel Trades Confederation and a member of the Trades Union Council Advisory Committee on the coal industry; G. H. Latham, J.P., chairman and managing director of the Whitehead Iron and Steel Co., Ltd., and president-elect of the British Iron and Steel Federation; and Richard Mather, chairman and managing director of the Skinninggrove Iron Company. A further member with general industrial experience is yet to be appointed.

#### HELPING METAL SHORTAGE

War Assets Administration recently announced two moves designed to help alleviate scrap metal shortages now hampering the production of steel urgently needed for industrial activities.

Minimum rentals, set at about 40 percent of those that could be expected normally, have been established by the WAA Office of Real Property Disposal for the use of all surplus shipyard facilities to be used by shipbreakers in the scrapping of surplus ships.

WAA Regional Offices have been authorized to deal directly with qualified contractors in the leasing of these surplus marine industrial properties. Local practices will be followed in drawing up the contracts in various sections of the country, but these instruments will also conform to the overall "minimum rentals" plan. All surplus shipyards, WAA states, are being held in reserve until the needs of the ship scrapping are determined.

When ship scrapping activity needs have been determined the "temporary freeze" will be lifted from the balance of the surplus shipyards facilities and these again will become available for purchase or lease commercially.

#### PLANT CONSTRUCTION

The American Brake Shoe Company announces that construction has been started on a new plant in Niles, Ohio for the making of railroad journal bearings.

When completed, the new plant will be operated by the National Bearing Division. It will consist of a foundry and machine shop building, "L" shaped, with an over-all length of 300 feet and an over-all width of 180 feet.

The plant will be equipped with the most modern machinery and lay-out for production. The equipment was designed by National Bearing's own engineering staff for the purpose of manufacturing a special product: Bronze-Back Babbitt Lined Car Journal Bearings for use on railroad cars and locomotive tenders.

The plant should be completed in six months and will employ from 50 to 60 workers. Production will start immediately upon completion.

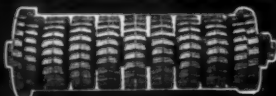
The National Bearing Division is at present operating plants in Chicago, Illinois; Pittsburgh, Pa.; Portsmouth, Va.; St. Louis, Mo.; St. Paul, Minn. and Meadville, Pa. A new plant is under construction in Meadville which will replace the present one.

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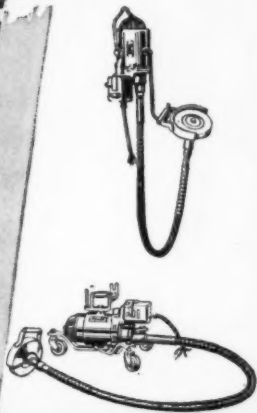
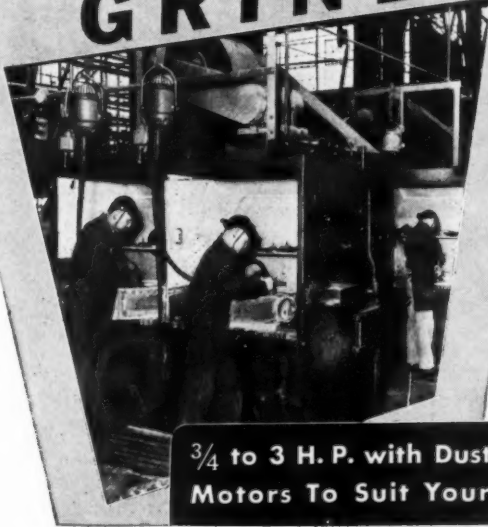


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# Fundamentals of Export Selling

By Ralph Colorado



**T**HE ENTIRE continent of South America, as well as Mexico, the Central American republics and the West Indies, are looking to U. S. industrialists not only for their equipment and products which these countries need, but also for guidance and "know how" in bringing to their people the industrial and economic development which has made our own standard of living the highest in the world. Except for the most critical commodities, government controls of exports are being removed and the opportunity for attractive business is today better than ever before.

• • •

The fundamental principles of the export business and basic export policies considered in this article must, of necessity, deal with elementary details, with which experienced exporters are thoroly familiar. However, this is written primarily for the guidance of those who are just entering the export field. It is intended for manufacturers who are interested in developing foreign markets for their products and for those who have had previous experience in this field.—The editor.

• • •

Because of the sale of large quantities of the raw materials which the United Nations needed during the war, there is an accumulated trade balance, in favor of the other Americas which amounts to billions of dollars! Yet, the task of selling any given product in this market requires vision and effort. There is right now, strong competition from British firms and the Swedes are also active in soliciting business in Latin America. The selling job cannot be done without a well conceived and carefully executed sales plan. Obviously the manufacturer with such an export program will have a decided advantage over other manufacturers.

## Studying The Markets.

It is not within the scope of this article to quote statistics on the totals of various products which have been sold in this market. Figures can be obtained by the manufacturer himself from any field office of our Department of Commerce. He can thus first determine, at the outset, the quantities which have been sold in the past and can make up his mind as to whether he wants his share of the business. . . keeping in mind that the market "South of the Border" is a growing one. Once the manufacturer decides to enter export markets, his first logical step is to determine the population centers, the potentialities of the markets and the actual distributing centers which are best suited for his product.

Clearly enough, the manufacturer of a "consumer product" requires a more intensive effort at distribution, than the maker of equipment which can be classed as "capital goods." To illustrate: the producer of an electric iron will need to establish dealer distribution in entirely different centers, than the maker of a drill press or power plant or any other product which is sold to manufacturers, utilities or municipalities. In the same manner, the manufacturer of agricultural equipment needs to cover entirely different channels of distribution, and possibly arrange for outlets in different areas, from those which would be considered logical centers of distribution for such products as household appliances, linens or cameras.

It is true that the large centers of population are also distribution centers for a wide variety of products, but in obtaining a thorough coverage of a country, it is essential to analyze all possibilities for distribution, to survey consuming areas and establish a sound and workable program with a chain of outlets.

## Setting Up A Price Structure

Once the manufacturer has arrived at a clear understanding of market pos-

sibilities, distribution centers and consuming areas for his product, he should immediately formulate a price policy and establish price structure including discounts which will be suitable for the requirements and will take into account established practices and the existing customs of the particular trade. If the domestic price lists do not take export packing into account, provision should be made for this additional cost.

The psychological effect of a price list which includes packing for export is better than the added charge for export packing. Yet the majority of export-minded U. S. manufacturers do not take time to figure out an export price schedule which includes these charges but merely add "export packing extra" or some such phrase. Generally speaking, export price lists should be established in a manner which provides for all the requirements of the trade but does not cause unfavorable reactions in the minds of prospective purchasers.

For the same reasons, export lists should be quoted at least "f.o.b. New York", "f.o.b. New Orleans" as the case may be, but not f.o.b. some interior point in the United States. The phrase "inland freight to port of shipment to be added" should be avoided since foreign buyers have no means of ascertaining what the cost of the inland freight will be from Chicopee Falls, Grand Rapids or Keokuk, to port of embarkation for export shipment. It is surprising also how many manufacturers will set up a price list that makes no provision for commissions to manufacturers agents in foreign countries or to dealers and jobbers, but quote their prices "net, f.o.b. factory."

Since the whole science of selling consists of making it easy for the prospect to buy, anything which causes an unfavorable reaction has to be eliminated. Price lists and discounts should be such that they make provision for the practices of the trade and help the pros-

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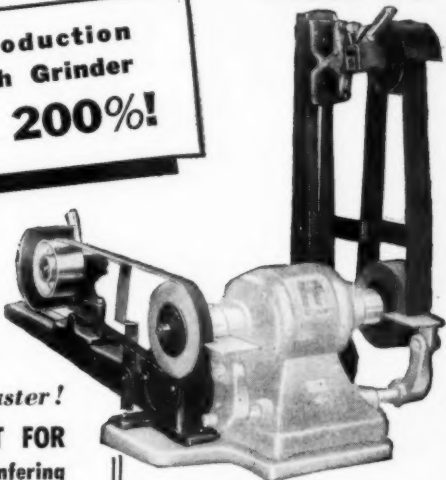
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*Electric motor not included  
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## ★ POWER BLADES

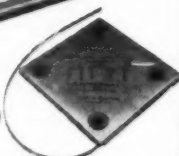


## ★ FRAMES



## ★ BAND SAWS

(including skip-tooth)  
(metal and wood cutting)



pective buyers to figure his costs for the product, landed in his own customs house in the city where it will be used. British firms, in the machinery business are quoting prices "C. I. F. Buenos Aires," "C. I. F. Santiago," "C. I. F. Rio de Janeiro" as against the almost universal practice of U. S. manufacturers of quoting prices f.o.b. port of shipment or "f.o.b. factory" at some inland point.

## Organizing The Export Department

The next question which the manufacturer must settle, according to the nature and the peculiarities of his own product, is whether he will sell through a commission house, combination export manager, manufacturer's representative or whether the volume of his business will be such that it is preferable and profitable to organize an adequate export department in his own organization.

## Commission House

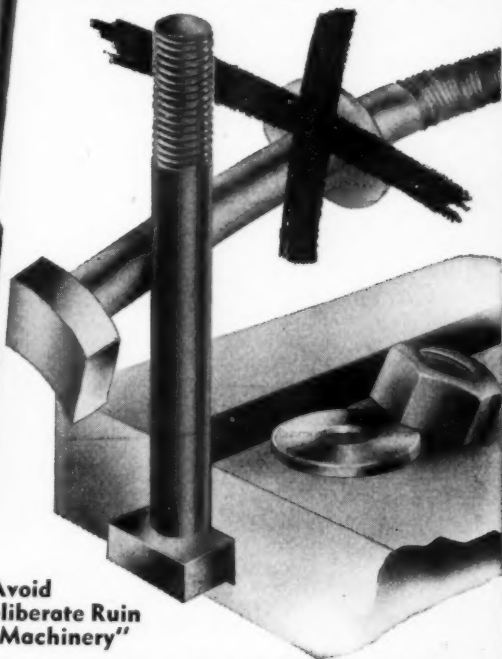
Originally the commission house, so called, began as a buying organization for their customers abroad, receiving a commission, usually a very small one, something like 1½ to 2 per cent, on the purchases ordered by foreign buyers. It was a natural development that manufacturers who had something to sell, would also approach these buying commission houses to offer their products for sale to the commission house's foreign customers. In some cases, these organizations developed into selling agencies for American products in export markets.

Inasmuch as the job of selling was a more costly job, commission for selling naturally also changed accordingly. Many of these commission houses organized fine distributing systems abroad and developed effective chains of distribution for a number of U. S. products. Particularly in the case of "consumer products" these organizations function extremely well, since they have the established connections,

# COPPER HEAD LAPS



## BOYAR-SCHULTZ SPECIAL T-SLOT BOLTS



... They pay for themselves in time saved! They work fast; they never wear out. The only wearing part is the replaceable sleeve. Sleeve adjustment feature permits maintaining correct lapping size till worn out and replaced with a new sleeve. Costly toolroom time is saved by using Boyar-Schultz Copper Head Laps. Available from stock in standard sizes  $\frac{1}{8}$ " to  $2\frac{1}{2}$ ".

### "Avoid Deliberate Ruin of Machinery"

"Most metal working machinery is provided with T-slots in Tables for fastening work. In modern production these T-slots are completely finished by milling or planing; consequently every surface is finished smooth and square. But when machines are put in operation, any kind of hodge-podge bolt is used for fastening work. It does not take long to ruin T-slots with such bolts, and after that has happened, a most essential part of the machine is ruined. The cost of proper bolts is very small, and I hope that my observations expressed here will reach the men in authority to avoid this deliberate ruin of American Machinery."

Above is from a letter to Tool Engineer, January 1946.

Boyar-Schultz Special T-Slot Bolts are made from upset forgings of heat treated alloy steels. Machined heads are square with bodies to present a clean flat surface to T-slot. Threads are carefully cut. For best results use Nuts and Washers made for use with Boyar-Schultz Special T-Slot Bolts.

**BOYAR-SCHULTZ CORPORATION • 2108 Walnut St. • Chicago 12**



are well known and have the means to provide a ready made system of distribution, which it would cost the average manufacturer many thousands of dollars to develop. Some of these firms also, have technical personnel, well acquainted with the requirements of mechanical lines.

#### **Combination Export Manager**

Where a manufacturer does not anticipate a sufficient volume to employ an export executive in his own organization, and where the amount of work required is not such that it will take the full time efforts of an export manager, the "combination export manager" is the answer to the problem. The combination export manager conducts the correspondence in the name of the manufacturer, on their own letterheads, and normally handles in his office a number of related but non-competitive lines. Because the combination export manager carries on all details and correspondence in the name of the man-

ufacturer, the identity of the manufacturer is not lost to the buyer. If the volume of business eventually becomes sufficient to warrant such a step, the manufacturer is therefore able to take over for his own account the further development of the business.

#### **Manufacturer's Representatives Abroad**

There are many capable manufacturers representatives in other countries who have a long record of success behind them. In such lines as it is practical to entrust local sales to organizations of that type, these men with many years of experience in specific markets, with many contacts in the trade, with the "entré" to all important factories and a knowledge of local conditions and requirements, can save the American manufacturer a great deal of time and money. They stand in the place of the manufacturer's own sales department, and with their knowledge of the language and local conditions can usually develop a good volume of sales for



## **SPRING PRESSES**

*Send for  
circular*

## **Power and Foot Operated...**

TAYLOR & FENN Spring Presses are used for Riveting, Staking, Stamping and similar operations on small, light parts. They are constructed to compensate for variation in thickness of the work and to deliver repeatedly a **UNIFORM BLOW**.

M-110 (illustrated) powered by a small reducer with a one-sixth H. P. motor, is designed to eliminate the fatigue factor inherent in foot operated Presses. A similar Press, M-120, of the same size and capacity is equipped to operate by compressed air.

#### **OTHER MACHINES MANUFACTURED:**

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Duplex Spline Millers  
Medium Duty and High Speed Sensitive Drilling  
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**THE TAYLOR & FENN CO.**  
**HARTFORD, CONN. U. S. A.**



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with the new Self-Indexing

**Enco** HEXTURRET

— the better bed turret



In today's battle to hold profit margins, Enco's versatile Hexturret provides the speed, accuracy and rigidity that increases lathe output and cuts production costs.

New rise grip clamping locks turret securely and prevents crawling under heavy cuts. Enco DOUBLE DRIVE assures quick, easy,

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Enco's many features add up to reduced lathe time on every operation . . . with a saving on unit costs. GET THE FACTS . . . Write today for special illustrated folder and prices.

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Export Division: Engineering Building, 205 W. Wacker Drive, Chicago



ENCO MANUFACTURING COMPANY, Dept. 211

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Enco Turret Tool Posts

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## SOMETHING NEW IN 3-WAY PARALLEL SET-UP BLOCKS

One Handy Set Speeds Set-ups  
To 12 Different Heights



Set includes six each  
of two sizes: 1" x 2" x 3"  
and 7/8" x 1-1/4" x 1-1/2"

This handy, compact set of Moore 3-Way Parallel Set-up Blocks takes the place of a large number of conventional parallels. Each block may be used in any of its three dimensions to build up to 12 different heights.

Spaced around the work-piece to provide support, parallel or perpendicular to working surfaces, they eliminate sagging, localize stresses and hold work rigidly throughout the machining operation. And they may be placed to avoid interference with holes being bored or ground.

Moore 3-Way Parallel Set-up Blocks are carburized chrome-nickel steel, finish-ground to  $\pm .0002$ "-.0000". Sides are parallel within .0001", perpendicular within .0002". Write for descriptive literature.

**MOORE SPECIAL TOOL CO., INC.**  
728 Union Ave. • Bridgeport 7, Conn.

MANUFACTURERS OF MOORE JIG  
BORER AND MOORE JIG GRINDER

such lines where it is practical and profitable for the manufacturer to deal directly with such agents from the United States.

### "Built-In" Export Department

In many cases, the same personnel who handles domestic orders, can take over many of the details of export orders, outside of such matters as the correspondence, quotations and special billing required.

Sufficient personnel may be trained in the organization to handle the actual export detail and an export manager and the necessary assistants, may well function as a "built-in" export department, utilizing the regular personnel of the company for such tasks as do not require special training or knowledge.

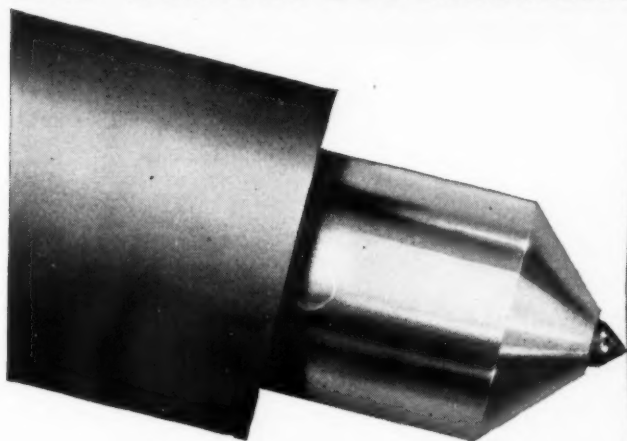
All this may be done under the direction of a trained export manager, and correspondence or documents that require translation can be sent to translation bureaus for the purpose. Sales literature can be prepared in the same manner, by obtaining translations of English material and preparing translations into Spanish, Portuguese or any other language, with the cooperation of export publishers and advertising agencies who are equipped to handle such material.

### Exclusive Sales Agreement

No export sales organization in a foreign country, however, will work without some form of agreement which protects them from the sniping that takes place when other local salesmen learn that someone is ready to place an order.

No matter what policy may be followed on domestic business, in the export market any line which is not handled through a single, responsible, well organized and respected local distributing organization, loses prestige, not only from the point of view of the distributors and selling organizations in the country, but also from the point of view of the buyer as well . . . the idea

# For Utmost Precision...



## use Desmond Diamond Tools

**THE PLAIN FACT** that Desmond makes the only complete line of grinding wheel dressing and truing tools is reason enough for specifying Desmond for all your dressing requirements. But there are other good reasons, too. Take diamond tools. We select rough diamonds with expert care, mount them (in hand tools or nibs) with hard-earned know-how, and *stand behind every single one.*

Fasten your Desmond diamond tools securely in the tool post or holder... with

the tool axis at an angle of 10 to 15 degrees with respect to the radius... and turn the tool frequently to present a new diamond point. As a rule large diamonds run cooler and *do more work per dollar* than small ones.

Write for your copy of the Desmond Catalog No. 45 today. It will help you pick the right tool for the job—and get the most out of it.

The Desmond-Stephan Mfg. Co., Urbana, Ohio

# Desmond

the only complete line of grinding wheel

## DRESSERS & CUTTERS



BALL BEARING  
DRESSERS



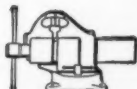
REVOLVING  
CUTTER TYPE DRESSERS



DIAMOND HAND TOOLS  
AND NIBS



WHEEL TYPE  
DRESSERS



SIMPLEX  
STEEL-SLIDE VISES

being that if a line cannot procure a serious and responsible sales representative, it must be something not worth having, something to be kicked around by the "scavengers" who presumably feed on the leavings of the market.

Not to be able to select a capable, effective and responsible sales organization to handle a given line, is a confession of incapacity. Through banks doing an international business, commercial information sources, credit organizations and even the actual references which the representative will send, it is easy to obtain complete credit and business data on any well established agency, with a fair prospect of making the right selection for the particular type of product which they are expected to sell.

It is easy to secure credit and commercial information on houses in other lands, as it is to ask Dun and Bradstreets for a commercial report in the United States. And once that the com-

mercial and credit information warrants the selection of a certain organization, the manufacturer should co-operate with them to the best of his ability. It should be remembered that the choice is only between sending your own factory salesmen to a foreign market or selecting a competent local distributor to stand in your place. Admittedly, the ideal situation would be to cover the market through a factory representative but we must avail ourselves of the services of a local sales organization which in turn, must represent several non-competitive lines, in order to make an adequate profit and be able to stay in business. Be that as it may, the local distributor, once selected and appointed, should be given the same kind of cooperation and assistance which the home office will give any of its own salesmen.

#### Too Much Territory?

Of course, it is always possible to give too large a sales area to an export



## DRILL JIG BUSHINGS

**A**ccurate  
**I**nterchangeable  
**C**oncentric

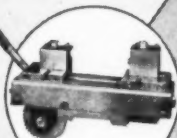
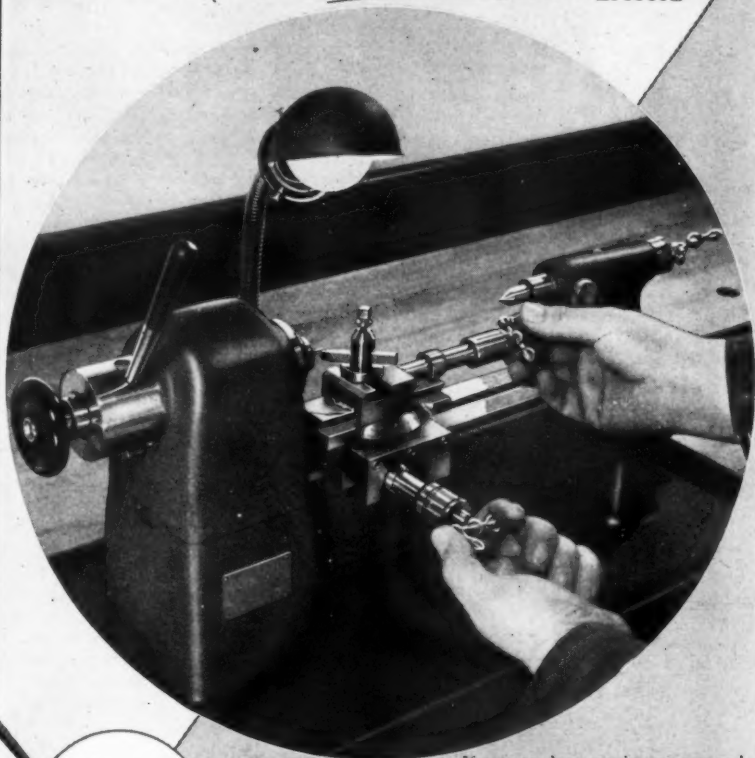
**A**cme  
**I**ndustrial  
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FOR  
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FOR THE TOOLROOM

THE *Gilman* INSTRUMENT  
LATHE



ADD THESE  
FOR PRODUCTION

If your products require accuracy and fine finishes, and the parts are too small to handle on large equipment, the Gilman Instrument Lathe will give you good performance for laboratory, toolroom, or production use. High spindle speeds, precision built throughout. An Instrument Lathe for instrument quality operations.

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ENGINEERING & MANUFACTURING

Corporation

JANESVILLE, WISCONSIN, U.S.A.

# NUMBERALL

## Rotary Stamp

(Patented)

Single wheel, for stamping on brass, aluminum, soft steel, plastic and wood, with a single hammer blow. All figures on 1 wheel, entire alphabet on 2. One stamp replaces 12 individual hand stamps. Characters from  $\frac{1}{16}$ " to  $\frac{3}{8}$ ". Also with shank for press.



Model 1H

Bulletin  
BB-1H.

## NAME PLATE DETAIL PRESS

Model 40 is for stamping details on name plates. Eliminates irregular and unsightly stamping on name plates, tags, etc. Available in  $\frac{1}{16}$ ",  $\frac{3}{32}$ ",  $\frac{1}{8}$ ",  $\frac{5}{32}$ " size characters. Dials contain all the letters and figures, diagonal line, and sign, dash, period. No experienced operator required. Steel, zinc, brass, fiber, etc., can be indented with a name or number.



Write  
for  
Bulletin  
BB40

NUMBERALL STAMP & TOOL CO.  
HUGUENOT PARK STATEN ISLAND, 12, N. Y.

representative. Attempts should be made to learn the number of salesmen in the organization, the manner of their operation and above all, how frequently they contact prospective purchasers within a given region.

Too often organizations which do not have adequate coverage of the territory, are entirely too ambitious in asking for "all of Central America" or "all of Mexico, the West Indies and Central America"—"all of South America" and other such equally extensive claims as to territory, when their organization may or may not adequately cover the territory for which they ask.

It should not be too difficult to find out how many salesmen are working in the territory, how often they make their trips and what area they actually cover. Agreements contemplating the exclusive sale for any given territory should be made with the understanding that the representative must prove himself, over a given period of time, (tentatively a year or two) during which he must produce an adequate and satisfactory volume of orders according to the possibilities offered by the market for the product. No. exclusive sales agreement should be made either for too large a territory or for an indefinite time, until the ability of the representative has been proved and that he has ample facilities for contacting at regular intervals all the available prospects in the territory which have been assigned to him.

### Cooperating With Distributor

It must be emphasized that the distributor in a foreign market stands in the same position as the factory salesman in the domestic market and that cooperation rendered him will assist greatly in developing the business. Advertising material should be provided for his use in reasonable quantities and in the language of the country, in the same manner that domestic salesmen are provided with the necessary sales

USE SCULLY-JONES  
*Style "B"*  
**DRILL CHUCKS**



See page 44,  
Scully-Jones  
Catalog No. 500  
for Style "B"  
Drill Chucks.

... and save the difference be-  
tween the cost of straight and  
taper-shank drills.

It's as much as 25% on drills  $\frac{1}{2}$  inch  
and under.

Scully-Jones Style "B" Drill  
Chucks are tough—take a lot of  
punishment and outlast many  
drills.

*Stock Delivery*

Write for complete information on  
prices and sizes—today.

Refer to the Scully-Jones Catalog  
showing over 500 types and sizes  
of cutting tools, collet chucks, boring  
equipment, centers, etc.

***Scully-Jones***  
AND COMPANY

1907 S. ROCKWELL ST. ★ CHICAGO 8, U. S. A.

2036MT

ammunition to be able to do their work. In such instances where the particular product presents an engineering problem, it will be necessary to train the foreign salesman and teach him how to obtain information needed by the home office to make proper recommendations and draw specifications suitable for the particular needs of the ultimate user.

Where electric motors and equipment are an integral part of the equipment, it is surprising how often the local salesman will forget to mention such fundamental data as the phase cycle and voltage of the power circuit. At the preliminary stages of the sales work, many distributors and sales organizations in foreign countries cannot distinguish between the lighting circuit and the power lines. And, of course, in some localities only the usual single phase 50 or 60 cycle, 120 or 220 volt lighting circuit is available.

It is therefore necessary, in most cases, to educate the salesman, in many

respects and provide him with the necessary sales information, as well as instruct him in the data required. If it is at all possible for the future representative to spend some time at the home factory, just like prospective domestic salesmen do, he will be better equipped and will carry away an enthusiasm and self-confidence which are indispensable in all successful sales efforts.

#### Summary

To summarize the information presented thus far, it will be now clear that the first requirement of successful export operation is a well defined plan for establishing foreign distributorships. First, of course, the exporter must determine whether he will use a commission house in the United States, a combination export manager, manufacturers' representative or attempt to use a "built-in" export department within his domestic organization. Which method will operate to best advantage

---

## For Efficient Dust Collection — TORNADO



Model R-400. Fifteen filter tubes. Fits limited space. Easily installed.  $1\frac{1}{2}$  h.p. motor. 1540 c.f.m. at 5500 l.f.m., static pressure  $3\frac{1}{2}$ ".

WHEREVER grinding, buffing, polishing or other operations cause fine dusts or lint, use the TORNADO Dust Collector, noted for its efficiency. Large filter surface. Exhausts clean air. Collects finest dusts or large, heavy particles. Improves health. Increases production.

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and demonstration

**BREUER**  
**ELECTRIC MFG. CO.**  
5118 N. Ravenswood Ave.  
CHICAGO 40, ILL.





## Tolerances Worth Maintaining Are Worth Jo-Block Protection

When you set up dimensional inspection tolerances, it's to insure a specified class of fit in assembly, or to make sure of parts-interchangeability, or for some other good reason. The harder it is for an inspector to be *sure* he's staying within limits, *the more it costs*.

So, why not put a set of Ford Jo-Blocks on guard? Make it part of somebody's routine to check every working gage—whether snap-gage, micrometer caliper, dial indicator, plug-gage, ring-gage, or any other dimensional test device—with genuine Ford Jo-Blocks at definite, frequent intervals. Then, you'll *know* that everybody concerned is “speaking the same language” of measurement. Chances are that inspection will speed up and rejections will be fewer.

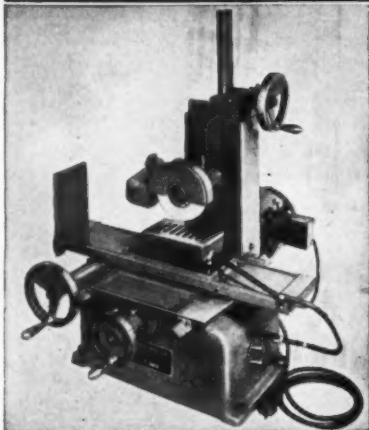
Jo-Blocks are not expensive. They're made to three warranted accuracy standards—plus or minus .000002", .000004" and .000008". Sold throughout the Americas as single blocks or in sets (metric measurement, too). Many accessories available to expand and facilitate use of Jo-Blocks.

### FREE—NEW CATALOG

Write for catalog No. 17, containing illustrated applications of dozens of Jo-Block uses.  
Address: Ford Motor Company, Johansson  
Division, Dept. 118, Dearborn, Michigan.



# SANFORD



## High-Speed BENCH SURFACE GRINDER

ACCURATE WITHIN .0001

A sensitive machine built to rigid standards of accuracy and workmanship specially designed "For the job that fits in your palm."

WRITE FOR BULLETIN

**SANFORD MFG. CO.**

1020-28 Commerce Ave.

Union, N. J.

will depend on circumstances and on the very nature of the product. The decision must be made by the exporter himself since only he is in possession of all the pertinent facts.

If he elects to operate directly thru foreign distributing organizations to which he sells direct, either for their own account or on a commission basis, it is an easy matter to establish their credit and the reliability and aggressiveness of their sales organization.

No agreements for export sales should be made except on a trial basis for a specified period. Conditions, terms of sales, discounts and prices should be clearly set forth and understood. A plan should be provided for cooperation with local distributors, not only in such cases where the product involves engineering problems and quotations to be made only on the basis of clearcut specifications, but also in the matter of referring all inquiries to him, providing adequate descriptive material, following thru with advertising campaigns and all other related details, to assist the distributor to present quotations when necessary and finally complete the transaction and obtain the order.

In a subsequent article the details of actually handling the export order will be discussed.

### HYDRAULIC EQUIPMENT

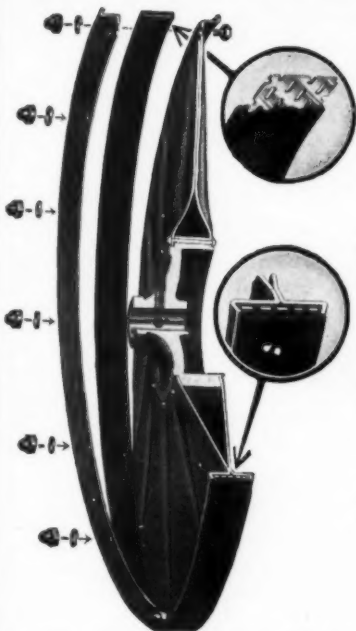
A ten-page brochure all about "HY-MAC" Hydraulic Power Units that may be adapted to any motion desired for new machines or for changeover to Hydraulics, has just been released by the Hydraulic Machinery, Inc., from their plants at 12825 Ford Road, Dearborn, Michigan and Glendale California. Among others are shown power units that have been adapted to grinding, milling, boring, drilling, pressing, piercing, riveting, etc. It is merely necessary to establish the functions of the machine that are to be hydraulically operated and then layout the circuits to best do the job—for feed and traverse of multiple or single tools, for indexing and locating, for clamping, etc., all or any of the movements and in any combination. A request on your letterhead will bring the literature.

# MODERNIZE

## *Economically* with **CARTER** **BAND SAW** **EQUIPMENT**

THE BIGGEST BUSINESS ever seen is in prospect for the manufacturer who is prepared to produce economically. With the cost of material and labor increased, modernization in production methods and machinery is the only way to reduce your costs.

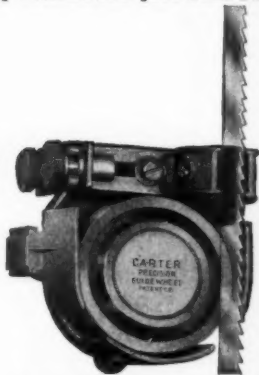
Carter products will speed up, improve, will definitely MODERNIZE your band saw operations.



- Carter Rigid Band Saw Wheels
- Carter Quick-Change Tires
- Carter Micro-Precision Guides

### WRITE TODAY

for illustrated circular on how you can economically modernize your bandsaw machines with Carter band saw equipment.



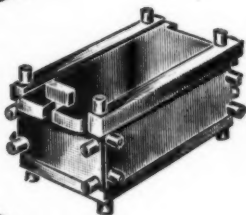
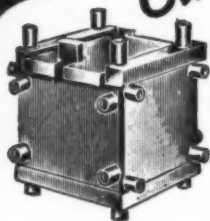
## CARTER PRODUCTS COMPANY

960 Michigan Trust Building

Grand Rapids 2, Michigan

# NEW-Drillet JIG BOX

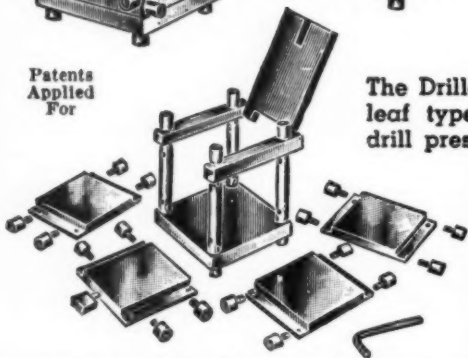
*Cuts Drill Jig Costs 75%*



Does Away with  
Special Tool  
Design of the  
Jig Body

Built in Standard  
Sizes and Shapes  
up to  
6" x 6" x 6"

Patents  
Applied  
For



The Drillet Box Jig is a six sided leaf type jig for all phases of drill press operation. Tooling expense can be reduced as much as 75%. All that is necessary is for toolmaker to locate part and insert drill bushings. Eliminates preliminary steps required in building and

squaring jig. Side plates, end plates and leaves are replaceable for immediate delivery. Before investing hundreds of dollars in your toolmaker's time — Write for Literature and Prices.

## CHICAGO DRILLET CORPORATION

1735 N. Winchester Ave., Chicago 22, Illinois

# Key Facts About Keys

By H. F. Williams

## Part 1

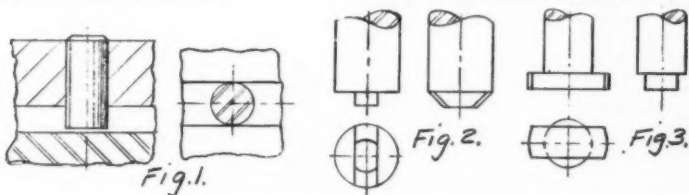
**T**HE TITLE of this article should really be "More Key Facts About Keys" as it is a further elucidation of an article under the same name which appeared in the June 1941 issue of the MACHINE TOOL BLUE BOOK. In that article, facts were given of the square, Woodruff, Hypro, spline or feather and tapered keys. Numerous designs were shown especially of the feather key, with fitting data and short cuts in assembling.

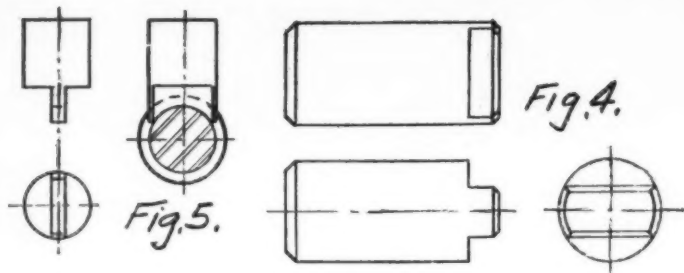
There are many other types of keys. Such designs as will be discussed in this article include pin keys, screw keys, keys of square, rectangular, round, hexagonal section adjustable, integral, block, retainer and special, in addition to those mentioned in the first paragraph. In fact further designs of the latter named types are also included in this discussion. Several are patented or used with patented devices and are included to bring before the reader a comprehensive group of these little gadgets that make the functioning of most mechanisms possible.

Regardless of the form these various keys take, each with their own peculiarities, their mission in the whole mechanical field is either to guard against rotation or to maintain proper alignment between members in an assembly. These designs will be taken in the order named or from the simple to the more involved types.

The pin key as illustrated in Figs. 1 through 5 is effectual if the flattened types are properly lined up with the keyway. In Fig. 1 a plain pin is pressed into the outer member and engages the slot in the shaft with proper looseness. As can be seen in the view at the right, there is only line contact at the sides diametrically opposite each other. Such a key is used only in light work where the torque is inconsequential. As sometimes happens the design is reversed, in which the key presses into the shaft and contacts the broached keyway in the bore of the outer member.

The key in Fig. 2 is chamfered either side to make assembling easier. The pin





is first machined as a truncated cone at one end. Thereafter it is straddle-milled to the required width. Many times, of course, the pin is merely squared and then milled with the approaching edges dressed off with a file or stone.

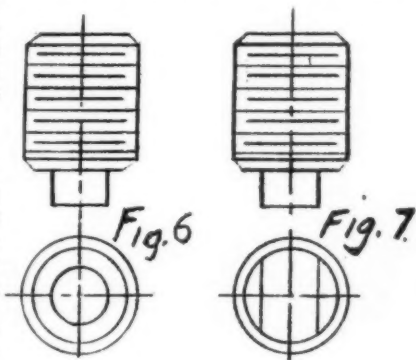
In Fig. 3, the pin has two diameters at first, then it is milled on the head to a width narrower than the diameter of the pin. While the other two designs are assembled from without the piece, this type must be pressed in from within the bore. Aligning jigs or fixtures must be used to assure proper engagement. The advantage of such a design is that a longer key is possible than with a plain milled pin in Fig. 2.

Sometimes the pin key is assembled loosely in the hole that accommodates it as in Fig. 4. Retained properly endwise, it is free to oscillate a little for alignment with the keyway. Such a design calls for chamfered corners to avoid the possibility of wedging. This key can also be pressed in to function in the same way as that in Fig. 2.

The key in Fig. 5 is an interesting device. It is used in a Shakespeare fishing reel of the level winding type and functions with a right and left hand grooved rod. The pin is retained in the line guide that keeps the line winding level on the spool. The key part is cut thin with a slight taper on its sides. The end view shows the shape of the end engaging the grooved pin. The pin

is free to oscillate in the hole so that reversal is readily accomplished to guide the line in the opposite direction.

The dog pointed set screw illustrated in Fig. 6, both half dog and full dog are used as a key at times. Sometimes they are assembled without a lock nut where vibration destroys engagement. Sometimes they are kept in place with a snap ring or flat retainer of some sort. The effect is much as the pin in Fig. 1 as line contact is all that is possible. The key made from a screw as shown in Fig. 7, is quite simple if enough length can be obtained at the end of the screw. This type however has one good characteristic, in that once engaged it cannot turn from vibration. Also it can be adjusted rotatively without first loosening a lock nut as the threads are the means



# AAC *Electro*·MIST

## ELECTRONIC OIL MIST AND SMOKE COLLECTOR



*Compact in design . . . Efficiently exhausts oil mist and smoke at its source, eliminating all hazards.*

*Unit is completely demountable — all parts removable without tools for cleaning. Complete information given in Bulletin No. 251. Send for it.*

**AMERICAN AIR FILTER COMPANY, Inc.**

*Incorporated*

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*In Canada: Darling Bros., Ltd., Montreal, P. Q.*

Completely self-contained—the Electro-Mist collects oil mist and smoke created by high speed cutting and grinding operations where coolants are employed.

Mist and smoke-laden air first passes through a filter removing metallic dust and large droplets of oil. It then enters ionizing unit where a positive charge is given each tiny particle of mist and smoke which are precipitated on grounded plates of opposite polarity. Air may be returned safely to work room.



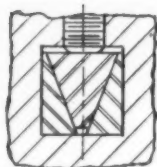
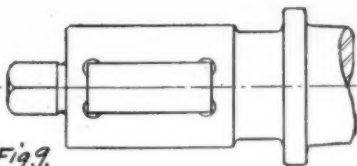


Fig. 8.



Fig. 9.

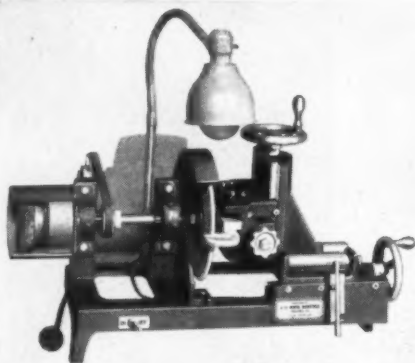


of retention. Depth of engagement is adjustable to within limits of one half the pitch of the thread.

The adjustable square key in Fig. 8 is really a costly assembly as it involves three pieces and a locking or adjusting screw. Two half wedges, identical in shape, flank the center wedge which is adjustable. If the screw is controlled with a lock nut, the key can be made slidable. If the screw is tightened, the key binds in the keyway.

In Fig. 9 is a diagrammatic view of a new quick-action key type arbor de-

veloped by the Austin Tool Works of Chicago. This arbor is used for machinery pulleys, gear blanks, sheaves and other work in lieu of collets, split bushings and press-on arbors. The rectangular shown in the side view is raised and lowered by an eccentric, this eccentric being manipulated by a wrench at the left hand end of the arbor. A quarter turn of the wrench is all that is necessary to lock or release the work. The key and eccentric are the only movable parts. The same design is adaptable for round, square or hexagonally shaped holes, involute splines,



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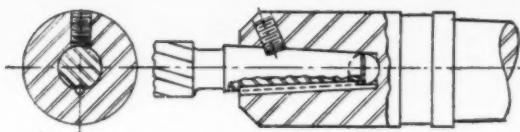


Fig. 10.

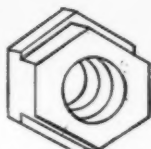


Fig. 11.

straight splined holes and round holes with one or more keyways.

A round or cylindrically shaped key is used in conjunction with a taper to drive high helix angle end mills. Both the holder and end mills are manufactured by the Midwest Tool and Manufacturing Co. of Detroit. Two views are shown in Fig. 10. The round pin is partially embedded in the tapered bore of the holder and runs parallel to the hole surface. A half round keyway in the tapered shank of the end mill fits the pin. The key therefore exerts full driving energy along the entire length of the end mill shank. A safety lock screw,

as shown, holds the shank firmly in place thereby giving a positive drive.

A hexagonally shaped locating key, patented by Vlier Manufacturing Co. of Los Angeles, is illustrated in Fig. 11. It is used to position fixtures on milling machine tables. This key is machined with three different widths so that the fixture with which it is used can be moved and set up without loss of time on different machines. Two sizes of keys are available, with combination widths to fit into slots of various size tables. Counterbored from either side, the key is reversed as required.



5

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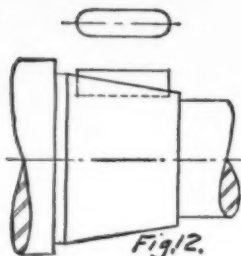


Fig. 12.

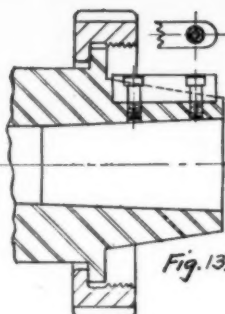
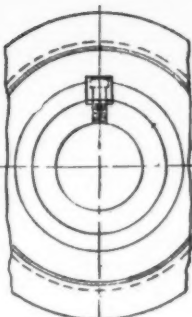


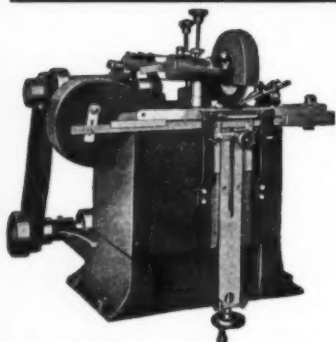
Fig. 13.



It was stated in the former article that the spline or feather key was developed by the Pratt and Whitney Co. some 30 years before. The keyway was sunk by a machine known as a spline miller and used a fish tail or two-lipped end mill rotating a comparatively high speed with a light feed both axially and longitudinally. The slot therefore had

rounded ends. Not only could the slot be machined so that the key fitted snugly on the parallel sides but the length could be controlled that the key contacted both ends of the slot at the same time. Uses at that time were with straight shafts either singly or in multiplicity.

In Fig. 12, this same type of key has



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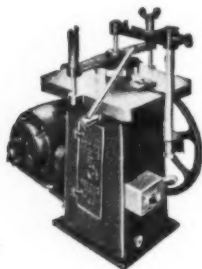
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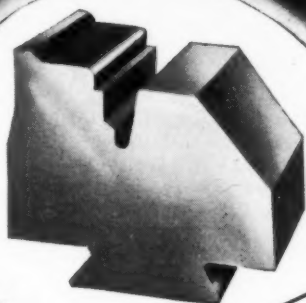
READING (CINCINNATI) OHIO

---

been adapted to the tapered diameter of a shaft in which the bottom of the slot is machined parallel to the shaft axis. Previously such shafts had the keyway milled parallel to the tapered surface which necessitated setting up the shaft at an angle when machining the slot. Such set ups became very elaborate, especially where long spindles or shafts were involved. As the shaft lay horizontally on the table, it assumed a position diagonally across the table and only one shaft could be machined at a setting. In the present installation the slot is sunk so that midway between its length the amounts of engagement and protrusion are identical. Therefore as an average the whole length of the key is so affected. When the keyway is broached in the bore of the mating piece, it also runs parallel to the axis and not to the tapered side of the hole.

In Fig. 13 the key is assembled into the nose of a spindle on which a chuck is mounted. This is known as a long taper key drive which is differentiated from the short taper of  $7^{\circ}$ — $7\frac{1}{2}'$  per side usually found in chucks having that American Standard spindle nose recess at the back of the chuck. In this instance the long taper of the spindle nose is  $3\frac{1}{2}"$  per foot. As in the previous example, the key is sunk into the spindle to half its height at a point midway along the length of the key. Friction alone is not relied upon to keep this key in place as in Fig. 12, two fillister screws being used with heads flush with the top of the key. The key is of the spline or feather type and has two rounded ends as shown in the plan view. Four different size keys are used for the four different diameter standard spindle noses. A key  $\frac{3}{8} \times \frac{3}{8} \times 1\frac{3}{4}"$  is used for a spindle diameter of  $\frac{3}{4}"$  at the large end of the taper. Keys  $\frac{5}{8} \times \frac{5}{8} \times 2\frac{3}{8}"$ ,  $\frac{3}{4} \times \frac{3}{4} \times 2\frac{7}{8}"$  and  $1 \times 1 \times 3\frac{1}{4}"$  are used for spindles having diameters of  $4\frac{1}{8}"$ ,  $5\frac{1}{4}"$  and  $6\frac{1}{2}"$  respectively at the large ends of the taper.

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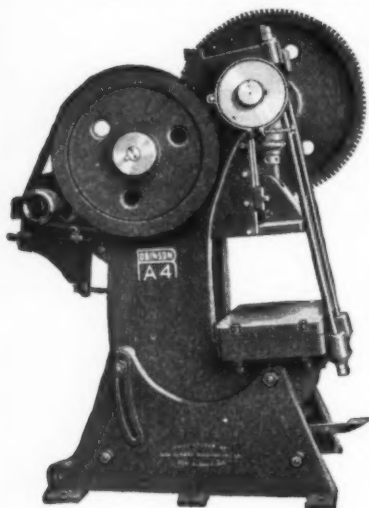
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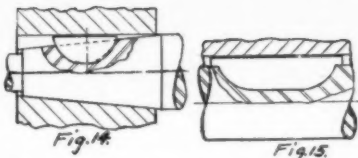
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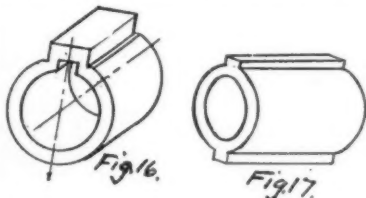
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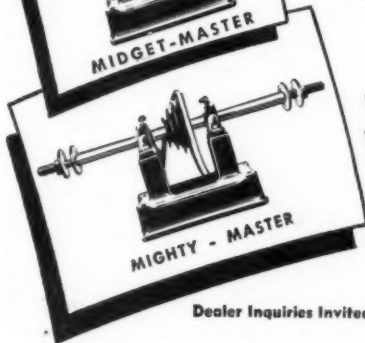
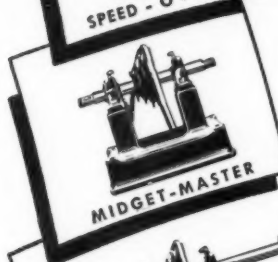
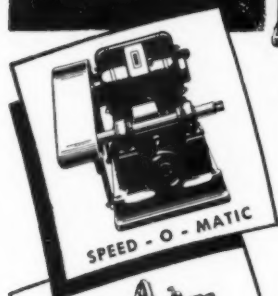
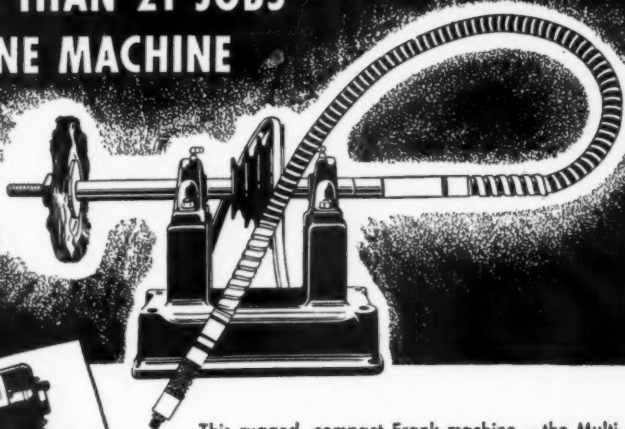


The same treatment can be given a Woodruff key as in the last two examples of feather keys mounted in tapered surfaces. In Fig. 14, the keyway is milled in the usual manner to the same standard depth, but the key is assembled so that the top side is parallel to the axis of the shaft. Average engagement in both shaft and keyway will be the same as standard. Of course, as in the last two examples, advantage is gained in the broaching operation in that the keyway is parallel to the axis and not with the tapered surface of the hole.

The Morton Hi-pro feather illustrated in Fig. 15 is a modified type of Woodruff key. It is claimed that this type of key is anti-rolling and anti-rocking when assembled with a shaft. In the former article a single segment key with short protruding shoulders was explained together with an installation where two keys were used end to end to make one long key. In this example, where a single long key is required the shaft can be milled with a regular Woodruff key cutter travelled along the shaft for the proper length of keyway. A feature of this key is that if the keyway is machined too deeply, the shoulders at either end of the key, resting on the shaft, maintain the proper height.



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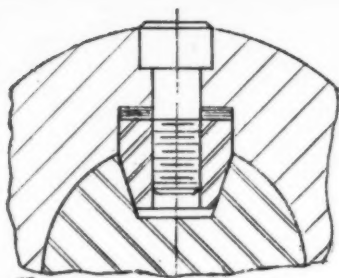


Fig. 18

A key, integral with the bushing which it retains is much stronger than when made as two pieces. Such an integral key as shown in Fig. 16 is made by Pyott Foundry and Machine Co. of Chicago for bushable sheaves. The wide key engages the keyway in the sheave while the key in the shaft engages the internal keyway. This latter keyway is small enough to leave a substantial wall

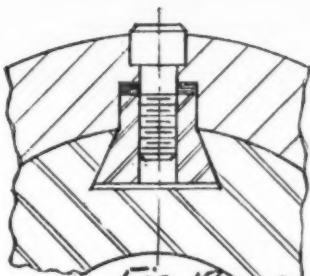
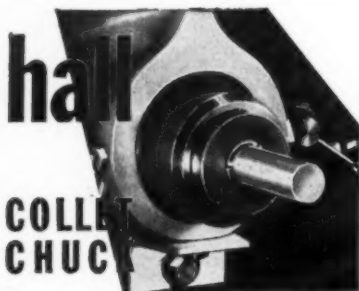


Fig. 19.

each side of the large key. The bushing is held in the sheave by two set screws. These bushings are made in a range of sizes for diameters from 3" to 18" and widths to accommodate 1 to 6 grooves for Vee belts of  $\frac{1}{2}$ " and  $2\frac{1}{32}$ " cross section. The bushings are cast.

A compound steel bushing with two integral keys for change gears, shown in Fig. 17, is made by Boston Gear



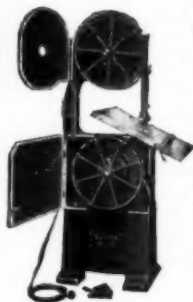
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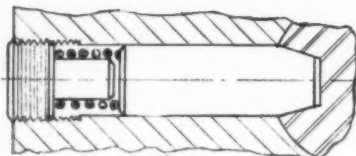


Fig. 20.

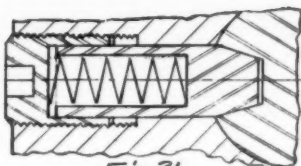


Fig. 21.

Works. The bushing has a smooth bore for a running fit on the gear stud.

Tapered keys are used where a minimum of running clearance is required. In Figs. 18 and 19 two types are shown, both shimmed. In Fig. 18, the shim must be of sufficient thickness to be peeled off for proper fit of key and keyway. If wear takes place a shim must be added. The reverse is true in the design in Fig. 19. Here a shim is removed to relieve wear. In both instances fillister head screws hold the keys and shims in place.

When there is enough metal in the piece surrounding the sliding shaft that

must be held with a key that engages the keyway without side or end shake, the tapered key, in plunger form, can be backed with a long or short compression spring. In the illustrations in Figs. 20 and 21 an additional feature is incorporated. At times when a sliding and adjustably keyed shaft reaches a specific position, it must also be clamped against further end movement. In Fig. 20, the spring, backing the plunger type of tapered key is adjustable by a piloted screw. When the shaft is to be clamped in the desired position one turn of the screw inwards brings the end of the pilot into contact with the

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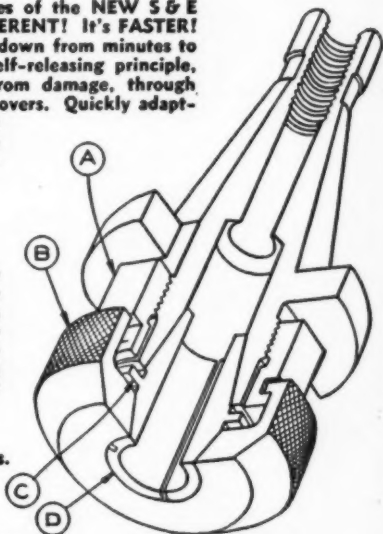
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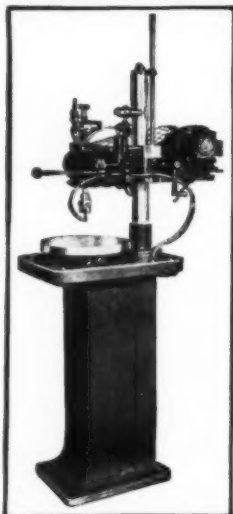
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end of the plunger, thereby forcing the key into a holding position in the keyway of the shaft. In this type of design the spring can be made of as heavy a wire as is required, by reducing the size of the pilot on the screw. Usually the screw does not need a means of locking, the friction created by the spring sufficing to keep the screw in place. However, a fine pitched screw is sometimes desirable altho several turns may be necessary to tighten the screw. If the length of spring can be controlled for a required end load, the clearance between the screw pilot and the plunger key can be kept at a bare minimum so long as contact between the two is broken.

The design shown in Fig. 21, makes use of a longer compression spring in that the plunger key is bored out to accommodate this spring. The hollow head screw is also drilled out, the hole having a square bottom for the spring. As in the previous example only a small space between the end of the plunger and the bottom of the hole in the screw is allowed for clamping purposes.

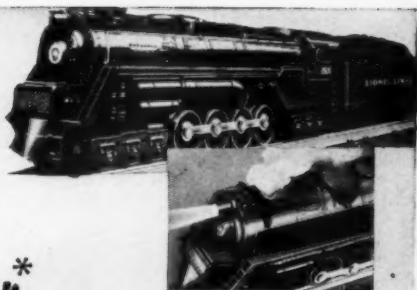
. . .

In a forth coming issue of the **BLUE BOOK**, the second and final part of this discussion of keys will appear. Various types of end-gaging or cross keys and key blocks will be illustrated. Some enlightening facts of the common square key will be given. Several examples of the retainment of the feather key will be shown. Long rectangular keys, ball key, disc key, and screw key will appear. Several examples of the "dutchman" have been drawn and the so-called "K-profile" means of driving will be discussed and illustrated.

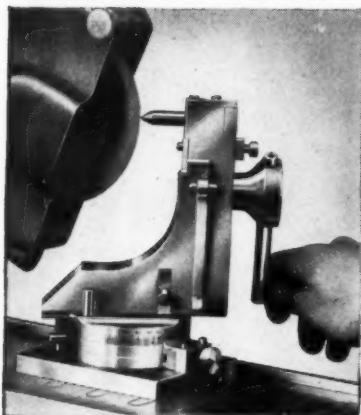
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gauge, \$4.95  
Less gauge, \$3.10



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regulator and  
pneumatic  
tools. \$1.85

### **BLOW-GUN**

Looks and  
operates  
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cleaning and blowing  
out chips, dust, filings,  
scraps, etc. . . \$3.00



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# Increasing Tank Production

By Howard Ginther\*

**W**E HAVE been able to effect a reduction of 25% in the overall production time of our "Lubester" oil dispensing tanks for gasoline filling stations, through the use of a single 75 KVA Progressive pedestal welder in our plant at Quincy, Illinois. It has therefore enabled the company to step up output 33% to meet the heavy demand for re-equipment of gasoline service stations.

An added advantage, we have found is that no skilled labor is required for

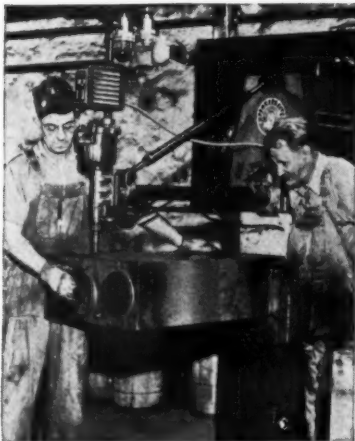


Figure 1

the operation of the spot welder and no difficulty has been experienced in training our own men to operate the machine.

Exterior surfaces of these tanks must be free from weld marks in order to present a smooth appearance when completed. This was one of the items in question, initially, and we are able

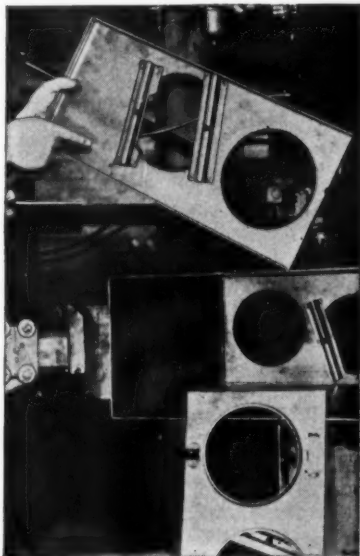


Figure 2

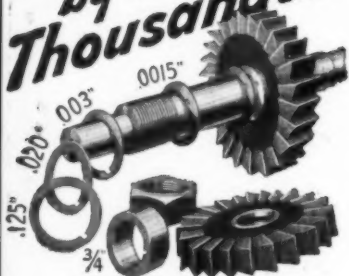
to handle it satisfactorily through the use of this welder.

The machine shown in operation in Fig. 1, operates on 220 volt 60 cycle supply. It has a throat depth of 48 inches and a special rectangular lower arm to accommodate the shape of the tanks. The upper arm, it will be noted, is braced from the machine column, virtually eliminating any deflection in the arms during welding despite the relatively deep throat depth of the machine. Controls are G. E. with Ignitron tube contactor.

. . .

\*Plant manager, Hollister-Whitney Co., Quincy, Ill.

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The operation being performed in Fig. 1 is the welding of the top to the body of the tank. Shown in Fig. 2 is the inside top of the tank showing the stiffeners welded inside the tank. Here, especially, surface marking is undesirable. The results obtained from this standpoint are shown in the part below the tank. Material used is 16 gage hot rolled steel, not cleaned prior to welding.

### HAND BRAKE

Shown here is the "Bendmore" Hand Brake of Carl Wirth & Son, 1625 Clinton Ave. No., Rochester 5, N. Y. This brake handles material from paper up to 3/32" thick, a full 12" wide.

The machine was developed for the experimental room to make accurate uni-



form bends on model work and sample parts. It is said to be rigid and can make clean bends by merely inserting the stock and pulling head cam lever. All gages of metal are usable without adjustment.

Bends up to 135° may be made, a stop is provided for the full range, or two stops are provided for duplicating and precision bending.

A bulletin is available showing sample products and price.



# Forty-fifth Annual Meeting

## National Machine Tool Builders' Association



Retiring President, Wm. P. Kirk, Vice President, Pratt & Whitney.

President, Herbert H. Pease, President, New Britain - Gridley Machine Div., New Britain Machine Co.



First Vice President, Alexander G. Bryant, Vice President, Cleereman Machine Tool Co., Chicago.

Treasurer Louis Polk, President, Sheffield Corp., Dayton, Ohio.



**C**HATEAU Frontenac, Quebec was the scene of one of this Association's most successful meetings, both in the matter of attendance and things accomplished. The selection of the old Canadian city was a wise one as it got the meeting away from our over crowded cities as well as making it possible for our friends across the border to become better acquainted with the individuals identified in an industry that had become well known to them during the war.

The first meeting on the opening day, October 8, heard president William P. Kirk, Vice Pres., Pratt & Whitney, Div. Niles-Bement-Pond Co., charge that after V-J day, when everybody said the need was for production and still more production, that the United States fell down on the job.

"The fact is," Kirk said, "that although we talked productivity, what we really did was to put every obstacle we could think of in the path of production accomplishment.

"Through renegotiation and excess profits taxes, industry was deprived of reserves which they needed for financing reconversion, redesign and expansion for peacetime products.

"In the case of hundreds of items, price control regulations stopped production cold.

"Strikes and slowdowns knocked an incredible volume out of our production totals.

"And finally, the supply of basic materials was messed up still worse by



Second Vice President, L. D. McDonald, Vice President, Warner & Swasey Co., Cleveland.

Director H. L. Tigges, Vice President and Sales Manager, Baker Bros., Inc., Toledo.



adding the red tape of government control to an already hopelessly muddled picture.

"If economic planners had stayed up nights for weeks trying to figure out how thoroughly they could sabotage the American post-war production program, I don't know how they could have done a more complete job."

Most of the blame, Kirk asserted, belongs on the doorstep of government and leaders of organized labor. Government, Kirk said, has followed a policy of appeasement, and union leaders have deliberately fostered, in many cases, schedules of limited productivity.

"Until we can get a fair measure of productivity," Kirk said, "prices will continue to go up in proportion to wages or even more; and the inflation cycle will continue; the scarcities and the black markets will be universal; and we will wind up in a national economic collapse. Steadily increasing pro-

ductivity is the one sure road toward low prices, high wages, steady employment and an increase in standard of living."

James Y. Scott, President of the Van Norman Company, Springfield, Massachusetts, and Chairman of the Government Relations Committee also speaking at the opening meeting reported that up to July 1st only a little over one-fourth of government-owned machine tools had been sold as war surplus.

"Machine tools to the original value of \$954,537,000 have been declared surplus," Scott said, "and it is thought that this is over 90 per cent of the eventual total. Of these, machine tools to the original value of \$257,000,000 have been sold.

"We feel that this enormous supply of machine tools, mostly of recent manufacture, should be put to work in the metalworking plants of the United

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2. Reel is adjustable to suit height of Press.
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Manufactured By  
**John Humm Safety Equipment Co.**  
253 SHEFFIELD AVENUE  
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States as quickly as possible to replace some half-million obsolete machines still in use.

"The results so far are very disappointing. Red tape, confusion and delay have been characteristic of the operation.

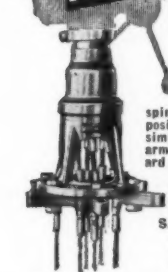
"In spite of all our effort, in spite of directives, in spite of statements of policy, practically no machines have gone to the schools. Never have so many expressions of noble interest been so barren of results. First, they were to have a 40 per cent discount. Then they were to be allowed to take machines that could not be sold commercially, and which would otherwise be scrapped. Now the thing is to charge a school six per cent of the original price. Why six per cent? Because that is supposed to cover handling costs. The schools who most need the machines can't pay six per cent. The Attorney General has ruled that the War Assets

Administration can legally give surplus to non-profit educational institutions under the Surplus Disposal Act as amended, but the machine tools are not going to the schools.

"We have long urged a proper reserve of idle machine tools to be held by the armed forces. Unfortunately, the last session of Congress passed a law prohibiting the transfer of property from one branch of the Government to another without payment. The armed services want these reserves, but only one or two departments acted quickly enough to secure any before the passage of that act. The entire reserve of all the armed services, not including machines installed in arsenals and yards, is probably less than one month's output of the industry at wartime peak."

Referring to the intent of the War Assets Administration to scrap certain machine tools declared "commercially unsalable", Scott said:

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**DRILL 6 HOLES AT ONE STROKE! — ADJUSTABLE FOR ANY PATTERN**  
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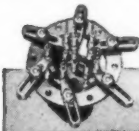
- Drilling time
- Set-up time
- Equipment investment
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**NOTE:** Special spindles are available to permit use of drills  $\frac{1}{8}$ " to  $\frac{3}{8}$ " diameter with corresponding minimum centers of  $\frac{1}{2}$ " and  $\frac{3}{4}$ ".

Write for catalog sheets and complete details

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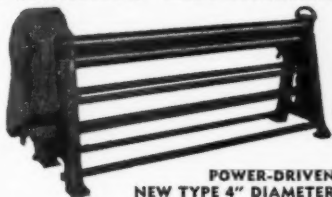
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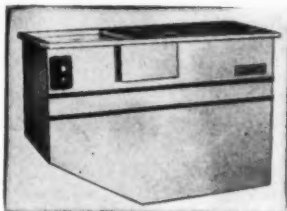
"Dealers in Principal Industrial Cities"

"In the face of a decidedly uncertain international situation, we are destroying part of our war potential that just does not exist in our shops in times of peace, that cannot be hastily improvised or commandeered. You know better than anyone how desperately hard it is to get such machines fast enough in time of war. They should be reserved by the armed services and the best of them stored."

Officers elected were Herbert H. Pease, President, Alexander G. Bryant, First Vice President, L. D. McDonald, Second Vice President, Louis Polk, Treasurer, Messrs. McDonald, Polk and Tigges were elected Directors. Tell Berna continues as General Manager and Mrs. Frida F. Selbert, Secretary.

#### METAL CLEANER

A new dip-agitating machine embodying an extremely simple principle has been developed by the Mabor Co. of Clark Township, Rahway, N. J. The drive mechanism mounted in a removable



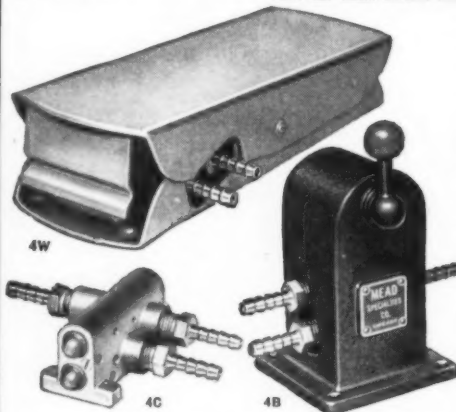
frame utilizes only two bearings, and balances the weight of the parts by means of a knee which rests next to the bottom of the equipment, outside of the tank.

Built in many sizes, for wash and rinse, and in special dimensions, it can be heated with steam, gas, oil, or electricity.

The dip-agitating method of cleaning parts is claimed to be efficient and inexpensive in many cases where a swishing action gives good cleaning results. It is said to avoid pump difficulties with solutions mixed with dirt, grit, and other impurities.

For additional information, quotations, engineering data, etc. write to the Mabor Co., Dept. BB, Box 77, Route 3, Rahway, New Jersey.

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**4B BENCH VALVE** . . . for use on machine table or bench. Functions as a 4-way valve . . . two 3-way valves . . . one 3-way valve . . . and as a 3-way valve and a blower.

**4W FOOT CONTROL** . . . pedal works valve either as 2-or-4-way. Adjustable pedal stop provides quick change from 3-way to 4-way. Same combination of functions made by rocking pedal as by moving lever of bench valve.

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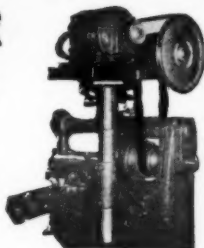
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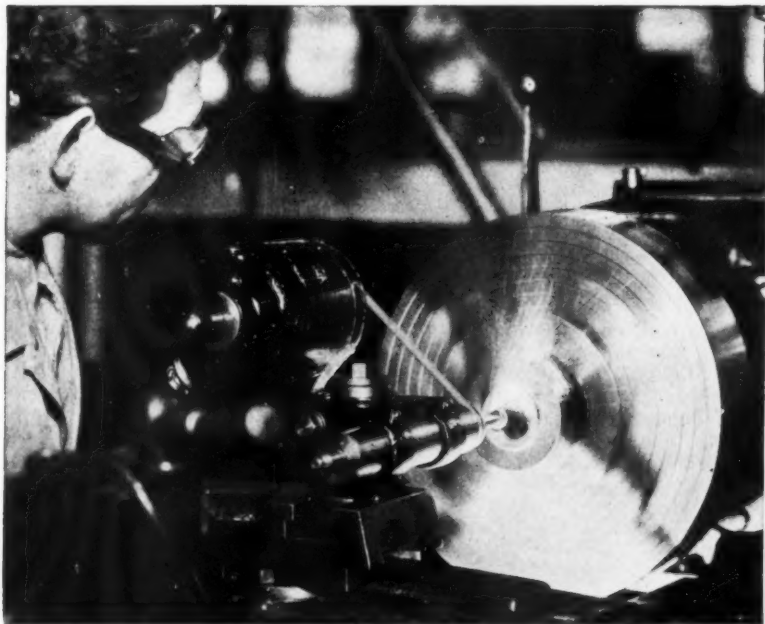
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# Internal Grinding Practice

## Part 2

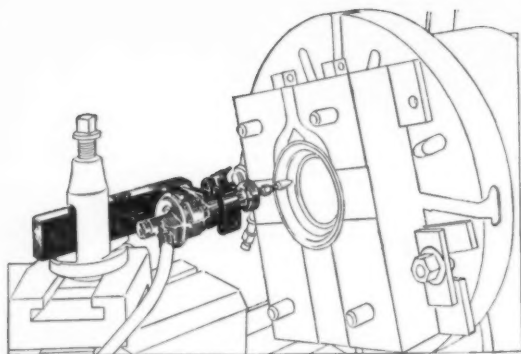
By JOHN E. HYLER



Lathe tool post grinders are popular for many internal jobs—especially drill bushings and similar pieces.

**I**T WAS pointed out in the foregoing article that, due to the difficulty of obtaining proper chip clearance in this kind of grinding, it is usually important to employ internal grinding wheels of relatively coarse and open type. There is another definite aid that can be em-

ployed, that is a high-quality grinding compound. It is also an advantage to use a proper lubricant in such a way as to keep both wheel and work free of accumulated grinding chips. If this is done it will then be possible to use a somewhat harder wheel on the same

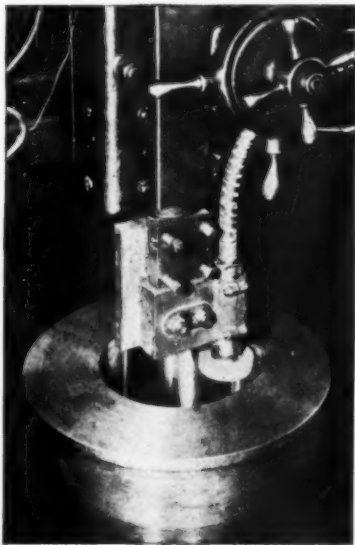


Shown here is a small air-powered grinder secured in a bracket-and-shank fitting, so it can be held in the lathe toolpost, and presented to the revolving work. A small mounted wheel is shown in use. These are available in various sizes and shapes, and are often used for internal grinding of very small holes, or for making very delicate cuts of special type. Illustration courtesy of Madison-Kipp Corporation, Madison, Wisconsin.

work, which is an advantage. There are differences in the grinding actions of different materials, and in consequence, different lubricants may be required, to obtain the best results. Kerosene is usually used when aluminum is being internally ground, often with some sort of additive, to eliminate the possibility of fire.

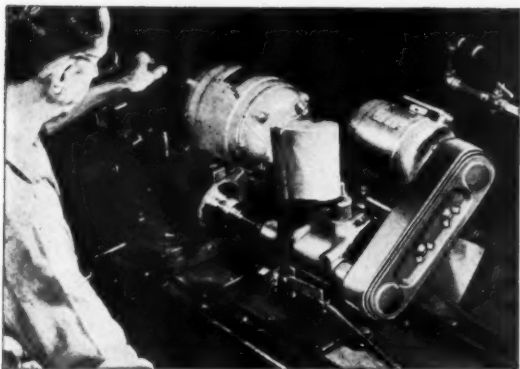
Cast iron is about the only type of material that can be ground dry internally, and a lubricant is even employed here in some instances. On work where high accuracy in the hole size is required, the use of plenty of coolant is advisable. There have been cases where no coolant was used and the diameter of internally-ground holes which checked OK in the machine were found later to have changed in size due to a subsequent temperature drop in the work.

The thinner the wall on bushings and like work, being internally ground, the more important does it become to keep the work cool while in process of grinding. This is true because a thin-walled bushing will not absorb and conduct much heat, and distortion may easily take place. Care must also be used in holding thin bushings, for if they are gripped in any type of chuck which exerts radial pressure, the pres-



Showing a flexible shaft grinder, designed for heavy tool post grinding operations, mounted on a boring machine, and doing internal grinding on a cylinder made from die steel, 25-3/16" outside diameter and 23-3/8" long, with a bored hole 12-3/4" diameter. Photograph courtesy of R. G. Haskins Company, Chicago, Ill.





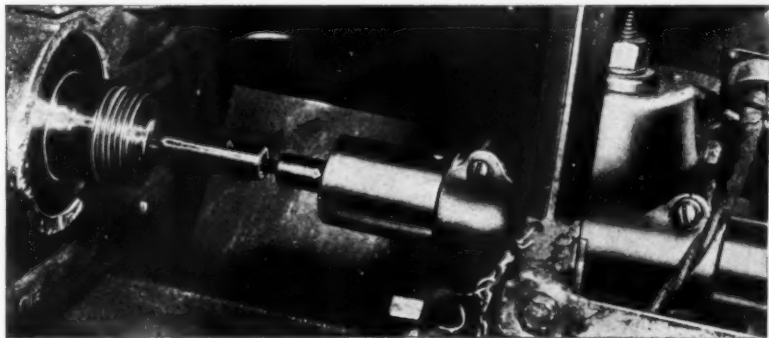
Milling machine rebuilt into a special internal grinding machine, by removing the milling head, and mounting a precision Dumore grinder in its place. The machine table stop controls the depth of feed for the grinder and the grinding wheel. Photograph courtesy of the Dumore Company, Racine, Wisconsin.

sure may distort the bushing, causing the hole to be ground out of round. To guard against such distortion while grinding, some type of device designed to hold thin bushings by clamping them endwise is employed.

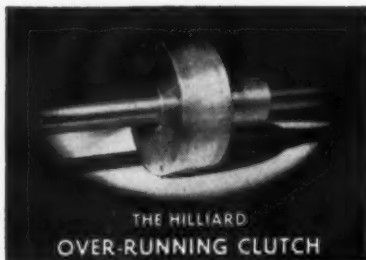
Considering the small diameter of wheels used for internal grinding, the novice might not think there could be any danger of wheel breakage. Such danger can easily exist, however, for to maintain proper surface speed of the wheel face, the speed is stepped up

greatly. It is always to be remembered that centrifugal force varies not as the speed, but as the **square** of the speed. It is well in every case, therefore, to be sure that a given wheel is not being run at a speed exceeding what is recommended by the wheel manufacturer.

If you are having trouble with wheel breakage, a few other points should be investigated. Lead or babbitt bushed wheels should never be used for internal grinding. One should be certain the wheel goes onto the spindle without



Shown here is a picture of the rebuilt milling machine, close-up, with the precision grinder mounted on a special fixture, and engaged in internally grinding tapered holes in quick-change collets. Photograph courtesy of The Dumore Company, Racine, Wisconsin.



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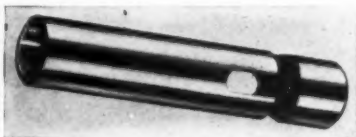
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forcing or stressing it. There should be a washer or blotter on both sides of the wheel, which will allow automatic compensation for any slight irregularities that may be present in mounting. Another point to guard against is excessive wheel pressure. This sometimes causes

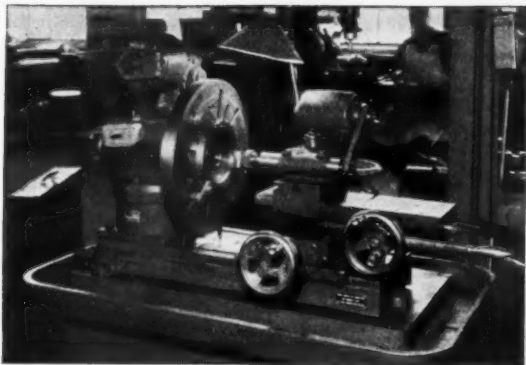


View of a quick-change collet, the tapered hole in which was internally ground by the Scully-Jones Corporation, employing a precision grinder mounted on a special fixture on rebuilt milling machines. Photograph courtesy of Dumore Company, Racine, Wisconsin.

breakage, especially in cases where there is not a suitable supply of coolant, properly applied. Too great a heat build-up in the grinding wheel is bad from the wheel breakage standpoint, as well as from that of causing possible work distortion. It is also worth while, of course, to be sure each wheel is sound, before mounting it on the machine spindle.

One thing that has puzzled many operators is their inability, in certain cases, to grind a perfectly straight hole. They are very careful in setting the work head, and in testing the grind time after time, but still do not attain the full degree of perfection they would like to have, in this respect. It is of course necessary to have the wheel face dressed perfectly parallel to table travel. Sometimes, increasing the work speed is helpful. It is found that the use of a harder wheel will in many cases overcome this trouble of undesired taper in the holes being ground. Where this is the case, it is because the wheel is too soft to hold the cut properly, to grind straight, as it should.

An internal grinder designed for versatility in handling work of various



Another view of bench type internal grinder, fitted with a different grinding head, for taking heavier cuts. Seven types of interchangeable spindles are available for this grinding head, and five types of grinding quills. Photograph courtesy of Abrasive Machine Tool Company, East Providence, R. I.

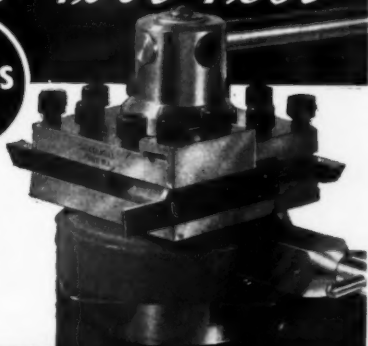
kinds is usually fitted with a wheel head of the quill type. On such a wheel head, a number of different sizes of quills can be used, as the occasion may demand. In designing a wheel head of this type, a certain amount of rigidity is necessarily sacrificed in the interest of the versatility obtained. Here the

quill and the spindle are in two parts, and the grinding wheel is farther away from the wheel head proper, than it is where a solid-projection spindle is used. This lack of rigidity is not enough to be serious, particularly if the operator selects the right quill for use with the given job. This selection is really

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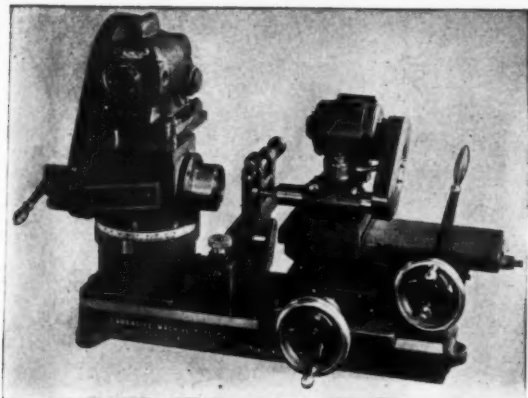
# Andersons, Inc.

2329 NELSON ST., CHICAGO 18, ILL.

simple, use the shortest and most rigid quill that will handle the job in hand. The shorter the quill is, the stiffer it will be, and a stiff spindle or quill is always on the side of good grinding.

Various devices have been developed and put into use on automatic internal grinders for the control of hole sizes, which relieve the operator of much manual testing. The operator can and often does use an ordinary plug gauge for such testing. In other instances, electrical dial indicators are used.

One interesting sizing device developed quite a while ago makes use of an automatic electric contact, which operates to stop the grinding when the hole has been ground to correct size. This is done by arranging a carbon washer on the wheel spindle, mounting it directly alongside the grinding wheel, in such manner that each time the wheel is dressed with the diamond, the carbon washer is dressed with it. Therefore, it remains at all times exactly the same diameter as the wheel. Located in the chuck which holds the work is a sizing ring of proper diameter, which makes an electrical contact with the carbon washer just at the time the hole is ground to the proper diameter. When this electrical contact is made, magnetic switches close, and complete a circuit which causes a solenoid to be energized. The magnetic switches remain closed until the slide has been withdrawn from the grinding position, and then they open automatically. When the solenoid is energized, it causes the feed pawl to be disengaged, and the grinding wheel to be backed off from the work a few thousandths of an inch. After the backing-off has taken place the feed-wheel is finally stopped. It is possible, by using different voltages in the circuit, to knock off the feed at different hole sizes. For this reason, the device can be used for knocking off the feed at both rough ground and finished hole sizes.



Bench type of internal grinder of versatile type, good for either toolroom or production work. The graduated swivel base is graduated 45 degrees each side of center. Wheel contour dressing device is seen interposed between the wheel head and the work head. Photograph courtesy of Abrasive Machine Tool Company, East Providence, R. I.

Where this is being done, an arrangement is made for automatically changing the voltage across the carbon washer and the sizing ring, after the operator has withdrawn the wheel for dressing and before finish-grinding

when he advances the feed-wheel by hand. It is not necessary that actual mechanical or physical contact be made between the carbon washer and the sizing ring, and of course the grinding wheel never, under any circumstances



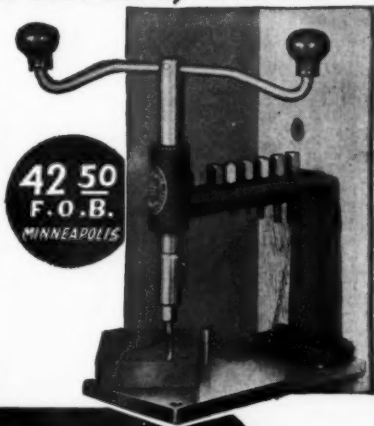
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Tapping in  
Half the Time**

The Dahlstrom Tap Guide practically eliminates tap breakage and saves wasted hours getting broken taps out of expensive dies. It does the job in a jiffy with work always straight and true. Just fasten it to a post or bench, slip a Tap Adaptor into the spindle, and even an inexperienced operator can handle it. Equipped with 7 Adaptors, ranging from 8-32 to  $\frac{1}{2}$ ". Taps not furnished. Ask your mill supply house, or \$42.50 F.O.B. Minneapolis.

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# *Dahlstrom* TAP GUIDE

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Diameter	Width	Hole	Net Price
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3	1/8	1	5.11
3	3/8	1	5.33
3	1/2	1	5.62
3	1/4	1	5.92
4	1/8	1	6.66
4	3/8	1	7.47
4	1/2	1	7.47
4	1/4	1	8.36
4	1/2	1-1/4	8.36
4	3/8	1-1/4	9.10
4	3/4	1-1/4	9.83
4	7/8	1-1/4	10.57
5	1/4	1	11.16
5	1/8	1	11.16
5	3/8	1	11.16
5	1/2	1	11.16
5	1/2	1-1/4	12.34
5	3/8	1-1/4	13.46
5	3/4	1-1/4	15.75
5	7/8	1-1/4	15.75
6	1/4	1	14.56
6	1/8	1	14.56
6	3/8	1	14.56
6	1/2	1	14.56
6	1/2	1-1/4	14.56
6	3/8	1-1/4	16.13
6	3/4	1-1/2	17.74
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7	1	1-1/4	29.79
8	3/4	1-1/4	33.76
8	1	1-1/4	39.46

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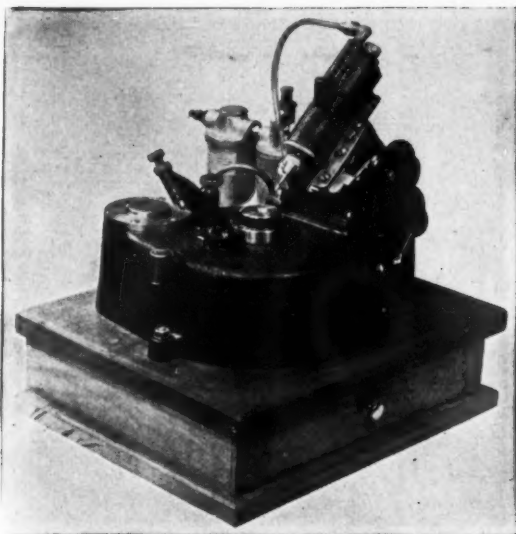
**Eastern Tool Supply Co., Inc.**  
178 GRAND STREET  
NEW YORK CITY 10, N. Y.

touches the sizing ring. Where the device is used for both rough-grind and finish-grind sizing, as mentioned, a relatively high voltage is used to knock off the feed for the rough grinding, and a lower voltage is employed for the feed knock-off at the finish grind.

Later automatic sizing devices developed and put into use involve the use of a rider cam, mounted on the handwheel for the cross feed. There is not space here for full description of this device. It may be said however that the rough grinding proceeds to the point where the rider cam mentioned, automatically makes a contact. The circuit completed by this contact causes the feed rate to be reduced for finish grinding, and at the same time brings a sizing indicator finger into contact with the work. The indicator itself later makes a contact, which serves to stop the feed, back the wheel off, and move the indicator finger away from the work. After this dressing of the wheel is performed.

There is one internal grinding machine which makes use of a solid plug gauge at the rear of the hole being ground. It is evident that each reciprocal stroke of the grinding wheel leaves the hole just a little larger. This plug gauge has an automatic action, so arranged that it tries to enter the hole at each retractive stroke of the wheel. So soon as it succeeds in entering the hole, the grinding ceases, leaving the job exactly to size. This gauge is meant for use on perfectly straight, cylindrical holes. Both a roughing and finishing gauge can be used in this manner, to govern the feed knock-off on both phases of grinding.

Other internal grinders do their finish sizing after the hole has first been rough ground to the preliminary known size. They operate on the basis of knowing how much the wheel is taking off at each pass, and advancing the cross slide just the required number of wheel passes on the finish grinding.



Machine developed by The Cooper-Bessemer Corp., particularly for precision grinding of fuel injection valve seats.

Both of these machines are highly efficient units.

It is of interest to note that some manufacturers of internal grinding machines also specialize in furnishing internal grinding spindles for all standard internal grinders in general use. These firms, together with many others, also provide special portable grinders, or grinding attachments, that can be mounted on the lathe compound, in one way or another. Some portable grinders

are really combination units, suitable for both external and internal grinding, and can be mounted on a milling machine, shaper, lathe or planer. Such units are often highly useful in shops having only a moderate amount of internal grinding to perform, and in some plants for standby equipment, in addition to standard or high-production internal grinders.

Bench-type internal grinders are found useful in various plants where



## A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



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MAXIMUM  
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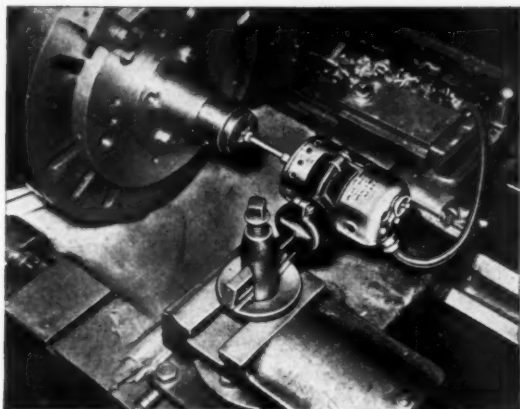
**THE MAXWELL CO.**  
220 BROADWAY • BEDFORD, OHIO

there is a large amount of light work in relatively small lots, through some of them go farther as production tools than might be supposed. There is one in mind that is heavier than most bench-type units, and capable of being fitted with either one of two types of grinding heads. One of these heads has a hole grinding capacity ranging from  $\frac{1}{8}$ " up to  $\frac{3}{4}$ ", and can grind holes up to 18" in depth. This head has 7 types of interchangeable spindles, and 15 different types of grinding quills are available for use with it. The other grinding head mentioned is designed for heavier cuts, on holes 1" in diameter or larger. Different interchangeable spindles and different quills are also available for this grinding head. There is sufficient cross adjustment for the grinding wheel, to allow of handling large-diameter work in some instances. A case in point is the grinding of internal rabbets in motor end bells.

Have you ever seen a machine which combined the functions of internal and surface grinding, and which also featured a built-in tool bar? One of the advantages of such a machine, is the fact that rough turns and finish grinds may both be made, without changing the work setup in any way. The tool bar on the machine in mind may be adjusted to any desired angle, for facing, boring, or outside rough cuts, and it is capable of being retracted, so that finish grinds may be made, without the necessity of first removing the tool bar. Internal tapers may be rough turned and ground, as well as boring and grinding cylindrical holes.

Some very fine multi-purpose grinding machines also have internal grinding facilities. One of these has a remarkable universal grinding wheel head, which rests on a slide having a double swivel arrangement. This wheel head carries both an external and an internal grinding spindle. To use the internal grinding spindle, after the external spindle has been in use, it is





The small-sized portable grinder shown here, you will note, is held in a special shank-fitted bracket, which adapts it for being held in the lathe tool post for internal grinding of the job shown. Photograph courtesy of Stanley Electric Tool Division of The Stanley Works, New Britain, Conn.

necessary to swivel the entire wheel head through 180 degrees. The wheels may be set at any desired angle with the work, and the feed may be operated in any desired direction. Angular set-

tings do not affect the operation of the wheel feed. Various spindles and quills are available for use with this machine, for internal grinding. It is obvious that here is a highly versatile unit.

# Libert

CIRCLE CUTTING  
ATTACHMENT  
Included as  
STANDARD EQUIPMENT  
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**MODEL  
1236**  
36-in. throat.  
12-gauge  
capacity.

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A—Magazine for dry graphite, B—Ducts to bearings, C—Spindle bearings, D—Safety hood. There's also a plain type and selection of cutting heads available.

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for complete details and prices

Modern tool and cutter grinders of universal type are nearly always supplied with an internal grinding attachment, for use on such internal grinding as is required in the toolroom. The internal grinding spindle, in this case, is driven from the regular grinding wheel spindle, and the work must be held and revolved in the cylindrical grinding attachment, or motor driven work head. Such a machine can be used for small lot production work, in an emergency.

Various things have been done to meet emergencies, in fact, with regard to internal grinding, especially during the late war, when it was not always possible to obtain just the type of equipment desired. We have noted cases in which precision grinders of the type designed for application to larger machines, have been applied to rebuilt milling machines, and used for grinding taper holes in quick-change collets, the machine table stop being utilized to control the depth of feed for the grinder and the wheel. We have also seen special flexible shaft grinders transformed into internal grinders of a sort, when mounted on a boring machine. Cases like this quite often arise, where some emergency type of internal grinding can be handled through the use of a portable grinder, or grinding attachment, properly applied to some standard machine.

#### COOLANT PUMP AND TANK

An addition to the present Delta Manufacturing Division's line of power tools, the new Coolant Pump offers many advantages as an accessory to machines where a free flow of coolant is required.

The new Coolant Pump has an exceptionally low cost and is highly adaptable because the flat machined flange permits use on most wet machine tools. It has a wide capacity—up to 30 gal. per minute at low heads—and will deliver water up to 2 gal. per minute to a 14-foot head. The  $\frac{1}{4}$  hp motor is fully enclosed and double-sealed, lubricated for life ball bearings mean complete bearing protection. The unit is neat and simple in construction and is portable, requiring a minimum time for installation.



*The World's Finest  
Boring and Milling Machine*

THIS new model 3-B JIGMIL has automatic power means to position the spindle from one location to another accurately to within much less than .0001 (one ten-thousandth part of an inch). Thus, extreme laboratory accuracy is conveniently available with ordinary skill that would normally make such precision very high in cost. This, and many other refinements, go further to prove that the JIGMIL idea is a totally new approach to the problems of precision boring at a new low cost.

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**GET TO THE POINT**

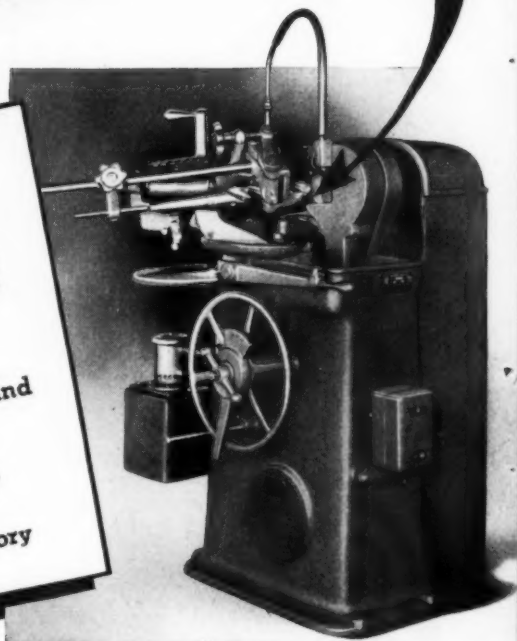
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SELLERS 6G  
DRILL GRINDER**

**Lengthens Drill Life**

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Especially adapted for grinding high speed twist drills of 5/16" to 3" diameter, the Sellers 6G Drill Grinder provides a method of grinding that automatically produces accurate drill points with duplicate lips and correct clearance.

Easy to operate by skilled or unskilled operators—in small job shops or large plants—this Sellers Grinder will pay for itself with savings in drill costs alone.

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# Carbide Drawing Die Practice

By Daniel Mapes\*



Since the service life of steel punches is sufficient for the average production run of a given container at Kidde (about 50,000 pieces), steel punches are used with the Carboloy dies. When the steel punch becomes worn, it is re-worked and used in a smaller diameter drawing operation.

**I**N CHECKING over our production records recently we made some interesting discoveries, for example we found we had a 50% reduction in scrap; a 25% to 30% increase in the number of O.K'd pieces produced; and a materially im-

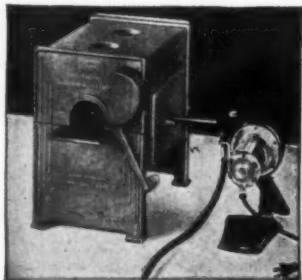
proved product due to elimination of surface defects in the finished pressings. We believe these to be some of the improvements resulting among other things, from the use of Carboloy cemented carbide dies for deep drawing

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## "ELECTROBLAST"

### High Speed Muffle Furnace

attains high speed heat  
in 20 minutes



No. 1 Furnace, as shown, muffle opening  $7 \times 3\frac{1}{8} \times 2\frac{1}{8}$ " complete with independent blower or torch and metal gas hose. . . . . \$70.

No. 2 Furnace, muffle opening  $7 \times 4\frac{5}{8} \times 3\frac{1}{2}$ " with built-in blower & gas hose. \$138.

Operate on city or tank gas for 7 to 10 cents per hour.

Built of best materials, they do high grade small work handily and efficiently

Adequate pyrometer equipment extra, if desired.

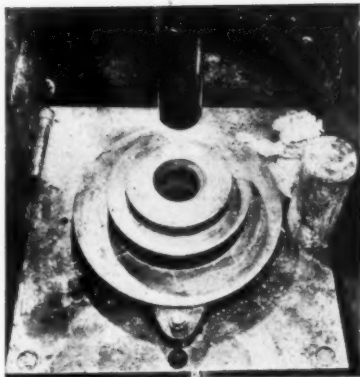
Write to us

**Stark Tool Company**

Established 1862

**WALTHAM, MASSACHUSETTS**

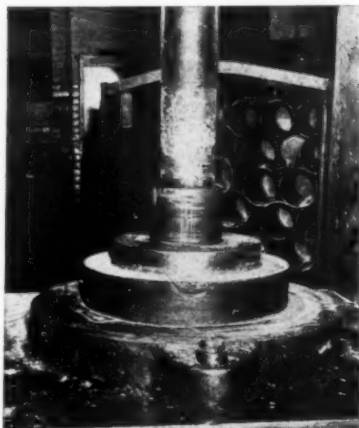
*Originators of the American Bench Lathe*



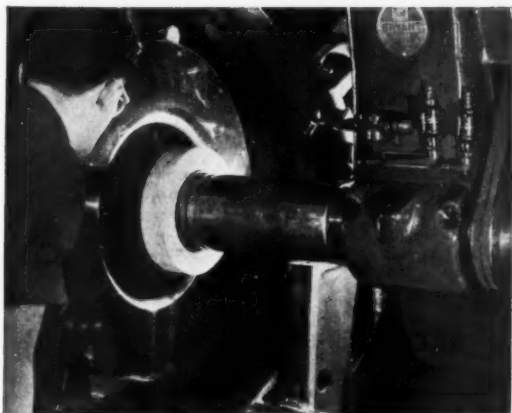
Close up view of start of deep drawing in a carboly die at Walter Kidde & Co., Inc.

sheet metal. This we do in the production of high-pressure, all-purpose gas cylinders for fire-extinguishers used in

Close up view midway of deep drawing operation in the same carboly die.



marine, industrial, and aircraft fields. We had made no basic change in our

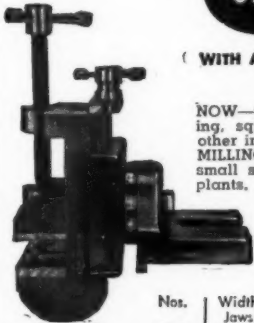


Reconditioning the carbide nib of a sheet metal die at the Walter Kidde plant.

fundamental die design practice, press operations, or lubrication when shifting to the use of carbide drawing dies.

At present, 95% of all sheet metal drawing, covering a wide range of

thicknesses, in a variety of metals, is being performed with these carbide dies. Dies range in size from an I.D. of 2" to an I.D. of 13½" The finished containers run from 2" in diameter by



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 Mfrs. of PALMGREN PRODUCTS for over 28 Years  
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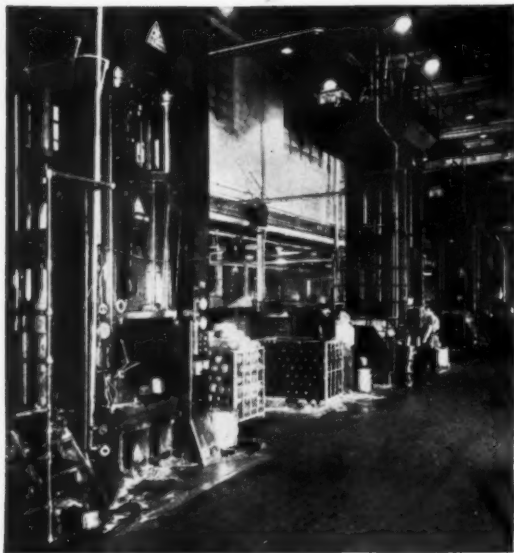


GRINDING TAP FLUTES

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SLOTING COLLET

CUTTING RETURN ON BLANK



A few of the hydraulic presses — equipped with Carboloy cemented carbide deep drawing dies — at Walter Kidde & Company, Inc. These presses are used in the deep drawing of high pressure gas cylinders from chrome-moly and other special alloy steels, mild steels, stainless steels, and aluminum alloys.

6½" long to 8¼" in diameter by 32" long. The metal stock includes tough chrome-moly as well as other types of alloy steels, mild steels, stainless steels, and aluminum alloys.

#### Die Design

It has been unnecessary to change drawing procedure, inasmuch as the carbide dies duplicate the steel dies formerly used. The hardness and high wear resistance of carbide metal make

it possible to take heavier drafts in Carboloy dies than on comparable steel dies without measurably reducing productive life of the carbide dies. For this reason some alteration in die size was made to take advantage of the economies derived from the fewer number of drafts.

In changing over to carbide dies, the various drawing steps were worked out dimensionally because the Carboloy

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⅜" ADJUSTABLE IN THOUSANDTHS  
. . . ⅜" TOOL DIAMETER

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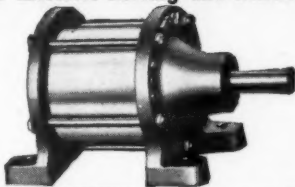
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We also make Thrust Bearings interchangeable with other manufacturers.

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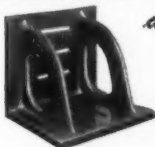
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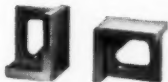
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Representatives: Some territories open. Write!

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**CERRO DE PASCO  
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dies permitted their being used for more than one operation. Thus, a carbide die used as a first draw die for one size cylinder is also used for the third draw in producing another size. With conventional die materials, total life was insufficient to make this dual-purpose die use practical.

It was found possible to use the same die setting practice for the carbides as for the conventional steel dies. However, somewhat more attention is paid to insuring perfect alignment between die and punch in order to protect the carbide die.

## Punches

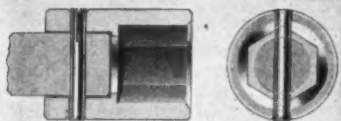
Steel punches are used with the carbide dies since the punches tend to wear less rapidly than the dies. Steel punches stand up for an average of 50,000 drawing operations, about the average production run here at the Kidde plant. Thus, no particular saving would accrue from the use of carbide punches insofar as down time for maintenance, etc., is concerned. When steel punches do wear down, they are reconditioned for use in smaller diameter drawing operations.

## Reconditioning

Carboly dies, it was found, do not usually require polishing until after some 10,000 similar operations, compared with 2500 for the average steel die. Although time required to polish a carbide die is about equal to that needed to polish a steel die, about 4 hours, there is a saving of around 24 hours of servicing on each die, based on the useful life of conventional steel dies.

Periodic polishing of the carbide dies is necessary to obtain maximum life and continuous maximum quality of product. To completely recondition carbide dies, the ring which eventually forms in the nib has to be ground out. The entire nib is then repolished, holding the nib as close as possible to original specifications. This process is

## TOSCO LOCK PIN FOR HEAVY DUTY SOCKETS AND OTHER APPLICATIONS



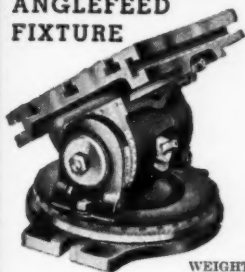
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HEAT TREATED  
THE COTTER PIN'S BIGGEST  
COMPETITOR**

A lock pin with no projecting ends.  
INSERTED with light hammer blow —  
**EASILY** knocked out. REPLACES SPRING &  
BALL or ring locks—Saves Mfg. Cost.  
Same pin can be used many times.  
SIZES  $\frac{1}{2}$ -3 in. long.  $\frac{3}{16}$  -  $\frac{1}{8}$  dia. shanks

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one half inches, and is ad-  
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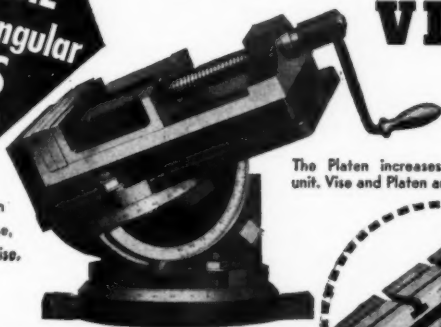
132 CHARLES ST. AUBURNDALE 66, MASS.

**SAVE TIME**  
on intricate, angular  
**SET-UPS**

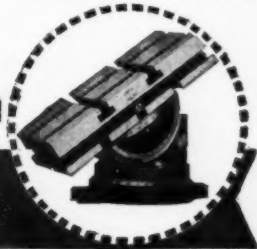
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Fully universal . . .  
three swivels simplify the  
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Parts interchangeable . . . can  
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a swivel vise or multi-swivel vise,

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The Platen increases capacity of the  
unit. Vise and Platen are interchangeable.



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## FOR ASSEMBLY, BENDING ★ AND BROACHING ★

1883 - GREENERD - 1946

### THE ORIGINATORS OF THE ARBOR PRESS IN 1883



### Precision Work in Manufacturing

An Arbor Press for every need, ranging from  $\frac{1}{4}$  to 30 tons capacity, both hydraulic and mechanical types. Write for Catalog G.

## GREENERD ARBOR PRESSES

NASHUA, NEW HAMPSHIRE, U.S.A.

EST. 1883

much the same as is used for reconditioning carbide wire drawing dies. The equipment used here at Kidde, for polishing sheet metal dies, is of somewhat heavier construction due to the size of dies involved.

### Performance

The productive life of the Carboloy deep drawing dies in use at our plant is typified by the record of one average die. Length of draw for this die was 22 inches. Some 250,000 drawing operations have already been performed with it, a total length of draw of nearly one hundred miles. So far, total wear on the I. D. is about .003 inch. Since dies are considered serviceable here at Kidde until wear has reached .005 inch, total productive life of this die is probably in excess of 400,000 pieces.

Use of Carboloy sheet metal drawing dies has effected a production increase per day of 25% to 30% in O. K.'d pieces. This is partly due to a decrease of 50% in downtime, for maintenance, installation of new dies, etc. Use of Carboloy dies has also virtually eliminated surface scoring, as well as formation of surface cracks in sheet metal, reducing scrap fully 50%.

The long life of Carboloy dies has made possible a reduction of inventory of deep drawing dies by 25% to 30%, thus substantially reducing the total outlay for dies. All in all, use of carbide metal for deep drawing dies, despite their somewhat higher initial cost—has resulted in a highly satisfactory saving per piece produced.

\* Vice President Walter Kidde & Co., Inc.

### MACHINE COMPANY EXPANDS

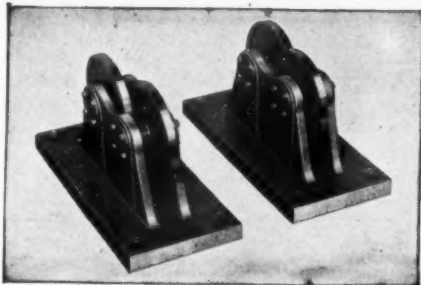
East Shore Machine Products Co., Dept. 9, 835 E. 140th St., Cleveland 10, Ohio, has acquired the tool and surface plate business of State Mfg. & Constr. Co., Franklin, Ohio.

The State line comprises Dialset Boring Tools with micrometric adjustment, Four-Cutter Boring and Reaming Bars, Velsey Black Granite (Olivine Diabase) Surface Plates.

# PILLOW BLOCK BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work.

Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



**Built in 1000, 2000, 5000, 10,000  
and 20,000 Capacities**

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Shop Tools**

ANDERSON BROS. MFG. CO.

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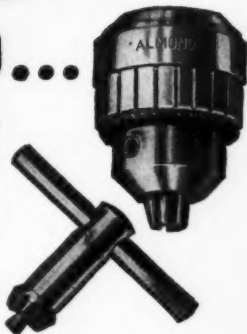
# ALMOND...

*Triple Jaw*

## DRILL CHUCK

The Almond Three-Jaw Drill Chucks were pioneers in the field of drill chucks. Since 1872 they have played a necessary part in the logical procedure of machine developments.

Almond Chucks are furnished in nine sizes with capacities from 3/16 to 1". They are made for heavy and light duty types with taper or threaded arbor hole — to fit all machine tools and portable tools.



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**The Original  
Manufacturers  
of Drill Chucks**

**T. R. ALMOND CO.**

ASHBURNHAM,

MASS., U.S.A.

# NEWS FROM SCOTLAND

Received from the Scottish Amalgamated Trade News Agency  
Edinburgh, Scotland

**T**HE SCOTTISH engineering and shipbuilding industries are now getting down, in earnest, to the job of post-war working and are making the initial move in stripping all redundant labour. That there has been a very considerable volume of uneconomic labour employed in all industry over the war years has been readily admitted. Few employers however, would publicly admit the fact that their own plants were overstaffed with inefficient or untrained workers. In private they did readily admit that the labour situation was poor. Now, in a competitive market, there is just no place for incompetence, untrained or unskilled workers are being disposed of as opportunity permits.

## Efficient Labour Demanded

The first clearance of some months ago saw the departure of most of the women machinists and other female and unskilled male trainees. Now a second and more definite clearance is operat-

ing. The semi-skilled men, the inefficient men are going, on the basis that time has now been permitted to assess productive needs against labour available. Employers are confident that their workers can handle the job with a smaller force. Employees are naturally not enthusiastic at the policy and in some instances strikes have been staged to protest against what is happening.

Ultimately, the position before the workers is this, they sink or swim with the employer and there is undoubtedly a full and growing appreciation of this fact in the country. For that reason it is unlikely that there will be any very great outcry although there is a present move to have basic figures fixed for the number of men required to handle specific jobs.

There is obviously the danger that employers would attempt to reduce the labour force, on specific operations, to a number below which the men might

## QUICK ACTING — INDESTRUCTIBLE CAM DOGS

★	<b>FAST - RIGID - POSITIVE - DRIVE AND NO MARS</b>				
Representatives	Operates by a flick of the thumb. No wrench required				
Wanted in	Style	A	1/2 To 3/4	Capacity	\$3.00
Principal Cities		B	3/4 " 1 1/2	"	4.00
★		C	1 1/2 " 2	"	5.00
		D	1 1/2 " 2	"	6.00

Quick acting cam dog that fills a long need. Possesses a sure non-marring grip—the greater the resistance, the tighter it grips, yet releases by a flick of the thumb. This precision built dog has a tool steel cam wide enough to dispense with brass shims, that will not dig in or mar.

Time is an element in production, use the tool that serves well. Order now, immediate delivery.

**GEORGE WHALLEY CO.** Dept. 101, 5005 Euclid Ave.  
CLEVELAND, OHIO



claim would be possible to work efficiently. Some agreement might be welcomed as to the specific number of men needed to handle precise tasks. The fixing of a basis of this nature is comparatively easy on any repetitive work, therefore this is not the type of work involved.

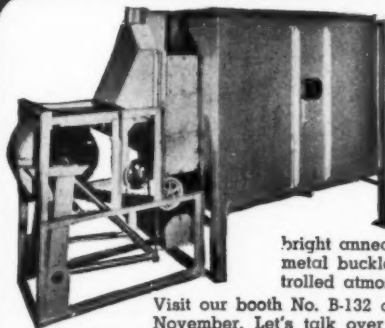
The bulk of the work in the yards and engineering shops is craftsman's work, on which precise labour forces will vary, but it is believed that certainly some agreement is possible and likely. Meanwhile plants are being stripped to the maximum level of redundant labour, all of which will find an immediate market elsewhere if it cares to accept the openings.

#### Strike for Higher Wages

The shortage of steel has been worrying manufacturers and engineering concerns in Scotland for some time past and an added threat is now apparent. The skilled bricklayers who maintain

the steel foundry and plant furnaces have demanded the payment of a rate of 7 shillings (\$1.40) extra per week plus 2 pence (4c) per hour extra. The 7 shillings increase is the rate given the steelworkers and although the brickmen are members of the Builders organisation they are pressing for the steel works increase. In the present instance some 400 bricklayers have struck work and threaten early closure to eight steel works in the West of Scotland, and the virtual paralysis of the steel industry, plus the loss of work for 8000 steel workers.

The expansion of the hydro electrical equipment industry in Scotland has been encouraged by the development of the North of Scotland water power schemes. The placing of hydro turbine orders with the Harland Engineering Co., and of electrical machinery with Bruce Peebles & Co., has been followed by an important development. John



### ANOTHER **NEW** **DEMPSEY FURNACE**

Incorporating a radiant tube application to continuous production, this Dempsey furnace was designed and built for a leading belt maker to bright anneal both ferrous and non-ferrous metal buckles and small parts under controlled atmospheres up to 1700°.

Visit our booth No. B-132 at the National Metal Show in November. Let's talk over your heat treating problems.

**FURNACES: Gas-Electric-Oil-"TAILORED" by DEMPSEY**  
**Meet every Heat Treating Need**



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## INDUSTRIAL DIAMONDS DIAMOND TOOLS DIAMOND WHEELS DIAMOND POWDER



Our No. 703 — three layers of seven diamonds each. Multiplicity of cutting points: depending on diameter of wheel, four or more diamonds will always contact the wheel, giving finer dressing and precision finish. Recommended in all straight-faced dressing and truing on wide-faced, hard silicon carbide wheels. Used most effectively on Cincinnati Centerless, Norton Cylindrical, Landis Cylindrical, and Cincinnati Cylindrical Grinders.

Requires fewer passes across the wheel. Generally used with fast dressing traverse.

**"Experts agree they are the best on the market."**



**Molina**  
INDUSTRIAL DIAMOND CO. INC.

31 W. 47th St., New York 19, N. Y.

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Pittsburgh—Commonwealth Sales Co.,  
200 Magee Bldg.  
Cleveland—C. G. Halloran, 14315 Savannah Avenue  
Chicago—J. R. Mendelsohn, 4744 Woodlawn Ave.  
Los Angeles—273 S. LaPeer Drive, Beverly Hills  
Teled—Hull Industrial Supply Co.,  
1644 Norwood Ave.  
Houston—Acme Engineers, 730 M & M Building  
South Bend—Formite Tool Co., Inc.,  
321 N. Michigan St.

Brown & Co., Ltd., Clydebank, shipbuilders of the Queen Elizabeth and the Queen Mary, are to manufacture three turbines. Glenfield and Kennedy Ltd., of Kilmarnock, the well known water engineers, have also entered the hydro electrical machinery field to produce turbines. Substantial orders have been placed with these two companies and there is every prospect of the present development being maintained. In accepting this work, despite the very great pressure of shipbuilding work, John Brown and Co. Ltd., have indicated that it will allow the company to broaden its employment basis and so ensure of greater work in a competitive period.

### EXPANDING ARBOR

The Asco Corp., 874 East 140th St., Cleveland, O., announces a new production tool for speeding certain machining processes. This tool, called the Asco "Auto-Arb", is an expanding arbor for use on secondary operations where work-



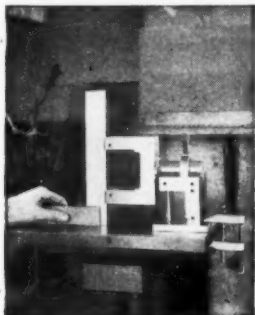
piece is held by the inside diameter. Its design permits chucking and unchucking work-piece without stopping spindle when used on a screw machine or lathe with standard collet. It is said to expand accurately, maintaining concentricity with the collet. It can also be used to advantage on drill presses or milling machines with collet devices.

"Auto-Arb" is made in sizes from  $\frac{3}{8}$ " to 1", at  $\frac{1}{64}$ " intervals. Entire range is accommodated with 3 collet sizes. Larger sizes may be made to special order.

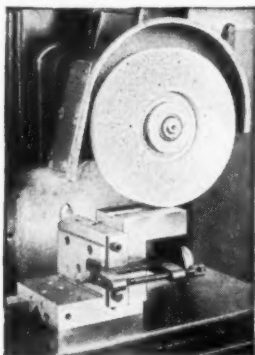


### PRECISION V-BLOCK ANGLE IRON

Every mechanic has had the experience of having spent hours preparing for a machining or checking operation that took only a few minutes to perform. A special work holder had to be made to precise dimensions and the work fastened to it, before the actual job was begun.



The Lassy No. 15 precision V-block Angle Iron was designed to eliminate many of these time-consuming bottle-necks. There are hundreds of uses for this tool, for layout, for inspection, grinding etc. Designed and made by experienced toolmakers, it is claimed by the manufacturer to do more than any similar device that is commercially available.



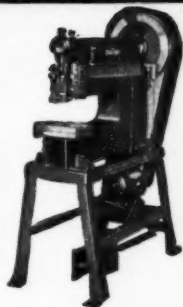
What is the Lassy No. 15 V-Block Angle Iron? Essentially it is an angle of finest steel with overall dimensions of  $3\frac{1}{2}$ " x 3" x 4" x 1" thick with the surface hardened evenly overall to a 60 thousandths depth (C62-64 Rockwell hardness), artificially aged for stability and with all

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Capacity—10 tons  
Speed—175 r.p.m.  
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*All types and sizes of punches  
and dies are available for  
these presses.*

WRITE FOR LITERATURE

### WHITNEY METAL TOOL COMPANY

116 FORBES ST.

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surfaces ground parallel and square within .0002".

One of the outer angle surfaces is machined with a V which will hold cylindrical work up to  $1\frac{1}{8}$ " in diameter. A clamp is provided for holding work in the V.

One of the most important accessories of this tool is a base plate which may be attached to either end of the angle iron. This base plate gives good holding surface on magnetic chucks and also provides a means for clamping to work tables. The base plate takes all the wear and saves the accuracy and finish of the angle iron.

Other attachments are a leg for supporting the angle of the iron and the side plate which may be attached in any one of ten positions to the angle iron. It is used for locating work in numerous positions where it may be machined parallel and square, or checked for these qualities.

A handsome folder, profusely illustrated with actual examples of how the V-block Angle Iron may be used, will be sent to inquirers. It will show the mechanic how this tool helps speed up work and improve its quality. Inquiries should be addressed to the Lassy Tool Co., Dept. BB, Plainville, Conn.

# CARBIDE NIBS FOR POWDER MOLDS

By WARREN BAKER

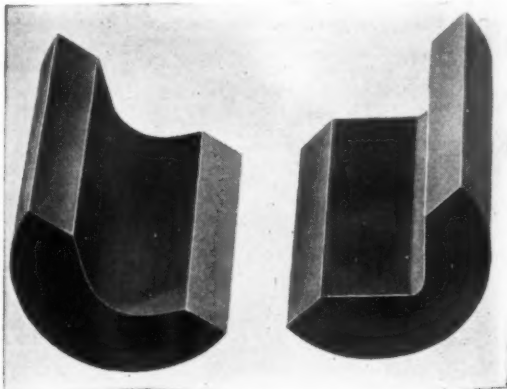
**A**FTER more than six years of experiments and actual production use under test conditions in some 100 factories all over the United States, a new procedure for the pressing of metal and other powders is now announced as not only successful, but from seven to ten times more efficient than many of the methods formerly used.

recutting equal to the original life of the mold.

The nib sections are simply reground when they wear out of size and it has been found that each such regrinding restores their full normal life.

Two such nibs are shown in Fig. 1. The nib section on the left is designed to form square or oblong compacts,

Fig. 1—Two shapes of carbide nib sections for powdered metal molds. The one at left forms an angular shape; the one at right a round or elliptical shape.



The new technique makes use of sectional nibs in the female end of the die to take the place of the solid steel or carbide molds formerly used. Advantages include, equalling or surpassing the production of the solid carbide molds, a gain of seven to ten times the production possible with steel molds, and a method of salvaging the molds after they have worn out of tolerance that gives an additional life after each

while that on the right will form round or elliptical shapes. The nibs themselves are preformed and sintered by the usual methods and may be had from most producers in either the rough or finished (ground) state.

Since they are formed ordinarily in halves, the regrinding to size is a simple matter. The edges only are ground on a diamond wheel just enough to bring the mold back to size when the nib is



A mold formed of sectional carbide nibs ready to produce angular shapes.

put together and placed in its steel casing and back on the press.

Originator of the process, it is understood, was the Firth-Sterling Steel Company of McKeesport, Pa. In any case it was Firth-Sterling who carried on the years of experimentation and the thousands of tests of the new process that made it production-proved. The Carbide Die & Mold Co., Pittsburgh, was, to the best of our knowledge, the first fabricator of the finished nibs and molds. They are now available to any industry or plant using such molds in the pressing of metal or other powders.

Some interesting results of the many tests made in American plants are now available for study. In one such case was a plant making tungsten-silver electrical contacts. The molds of tool steel formerly used had to take a pressure of 40 tons psi on the hydraulic presses installed there, and still the points were not dense enough to prevent occasional burning in use.

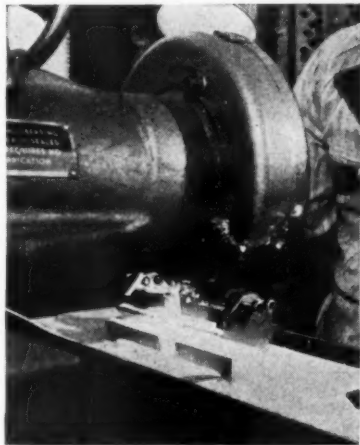
Furthermore, the steel molds had to be discarded after some 12,000 compacts had been made in them. It was then decided to try the sectional carbide nibs with a carbide tipped plunger for the male member of the die. At the same

time the manufacturer increased his pressing pressure first to 60 tons psi and finally to 70 tons.

After 27,000 compacts had been made with the new setup, the copper braise between steel plunger shank and carbide tip failed. A new plunger of solid carbide was tried, the carbide being shrink-fitted into the steel shank. The mold then continued in service to 124,000 units. It was then examined and the wear was found to be less than 0.001". The plunger was redressed, 0.008" being removed from its head.

Since the mold had worn a total of less than 0.001" and the tolerance allowed on such finished parts as these contacts was 0.005", it was estimated that the mold should be good for 500,000 compresses before recutting would be called for. The engineer on the job further estimated that the nibs would stand five recuts before their useful life was over, so he forecast a production of 2½ million units for the mold made of carbide inserts.

Grinding the sectional nib to size, or recutting it for salvage is done with a diamond wheel on a surface grinder.



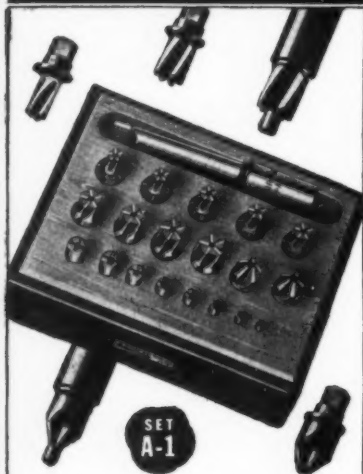
These efficient tool kits speed up your counterboring and spot-facing work, by putting a wide range of cutter and pilot combinations within easy reach. Seven sets from which to choose.

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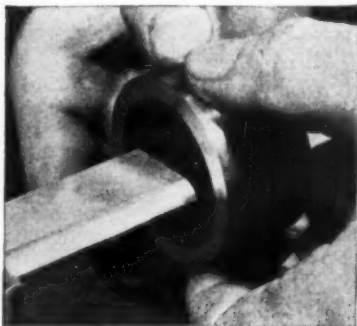


This set includes: one type A-1 holder; nine cutters from  $\frac{1}{4}$ " to  $\frac{1}{2}$ "; eight pilots from  $\frac{1}{16}$ " to  $\frac{3}{16}$ "; two  $\frac{1}{2}$ " countersinks, one 70° and one 82°, in hardwood box with hinged cover.



It was found later in regular operating test runs in various other plants that such carbide-insert dies will produce 500,000 pieces per cut as a normal thing. Many molds now in use have been recut as many as five times and it appears that 10 to 12 recuts are entirely possible in many cases. Users are urged to provide full data on anticipated production so that specifications on the original amount of stock in the carbide nibs may be regulated to conform.

Hardness of the sintered carbide nibs is determined by the manufacturer on



The mold, inside its steel case, is hand-lapped to shape and size with diamond powder.

the basis of the powder to be compressed. Test applications thus far have covered such metals as brass, bronze, copper, iron, tungsten, tungsten-silver, and the metalloid, carbon. The new type molds also have been found exceedingly useful in the pressing of pharmaceutical pills.

Tests show that molds made of tool steel average about 6,000 units when tungsten is being pressed and 30,000 when the comparatively unabrasive forms of powdered carbon are being compacted. If no regard is given to the material to be pressed, the general average for tool steel molds is figured

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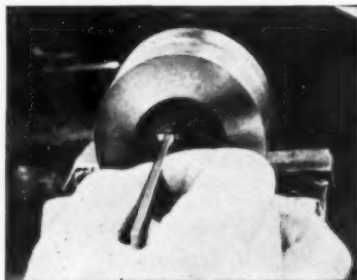
DEPT. H 351 S. LA BREA AVE.,  
LOS ANGELES 36, CALIF.

**MANUFACTURERS OF OPTI-TOOLS**

at 10,000 units. The sectional nib molds of tungsten carbide have shown an average of 70,000 units in comparison with a useful life of 10,000 for steel.

The decision to shift from solid to sectional molds came about after it had been observed repeatedly that a sharp corner in a solid mold under load doubles, triples, or quadruples the stress, depending upon the angle and sharpness of the corner. Under such repeated high stresses, the corners were found to crack and chip.

Recutting of such solid nibs was practical only by reforming them by hand, a tedious and difficult process and one requiring great skill. By com-



Checking the mold to size with gages.

parison, the lapped seams in sectional nibs were found to result in controlled cracks that were comparatively free of trouble and easily removed from the finished compact, if such were necessary at all. Also the use of sectional nibs made it possible for the user to finish his own molds by a relatively simple process, merely by grinding them to finish and tolerance required.

The major advantage of the sectional as against the solid mold, of course, is that the nib may be easily recut and that the life of the entire mold is limited only by the amount of stock that is removed in such recutting. Recutting to the original size is thus ad-



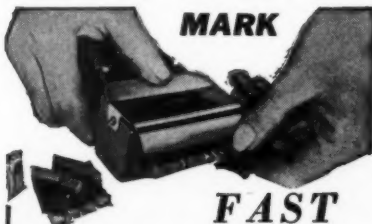
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If you don't know diamonds know your diamond dealer. Our 45 years in this field merits your confidence.

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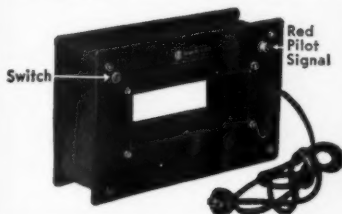
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**Stainless  
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**THE PERFECT TOOL**  
for machine shop,  
tool room, inspection  
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- External, internal and depth measurements all read simultaneously with a flick of the thumb on one vernier scale.
- "Open Window" type sliding jaw exposes scale completely and allows a free reading.
- Knife edged hardened jaws accommodate thread measurements.
- Accurate measurements to .001".
- Packed in a sturdy leather case.
- Painstakingly machined, American made.

Catalog Number	Size	Scale Graduations	Vernier Reading
21	6"	1/40"	.001
22	6"	1/40"	.001

& full mm. & 1/10 mm.

Also AMIC Precision Vernier Calipers, Height Gages, Depth Gages, Pocket Calipers, Comparators, Precision Graduated Metal Scales.

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**AMERICAN MEASURING  
INSTRUMENTS CORP.**

**240 WEST 40th STREET  
NEW YORK 18, N. Y.**

vantageous for both standard shapes and special ones, where long production runs are called for, because the worn molds are reclaimable. The carbide was used for the sectional inserts because tungsten carbide under stress has a compression strength of 700,000 psi, resulting in far fewer failures where sharp corners and angles must be shaped.

One spare mold on hand while a worn one is being recut not only allows production to continue without inter-



Fitting the plunger (carbide tipped) to the mold. The tolerance in the case pictured is 0.0003" each side.

ruption, but makes it possible to control size to far less than the tolerance limits at all times.

It will be obvious also that the mold not only can be recut to its original size but may be reformed even to a larger one within the limits of the diameter itself. It is estimated that such salvaging, possible with sectional nibs and particularly with sectional nibs of tungsten carbide, will reduce over-all mold costs to about two-thirds that normally estimated by production and tool engineers.

• • •

(All photos should be credited to Firth-Sterling Steel Company, McKeesport, Pa.)



# IT'S YOUR OWN BUSINESS

By Arthur Roberts

**If you are one of those who believe that business is going to pot, that things are all headed for perdition, read this article by Mr. Roberts, it may change your mind.—Editor.**

A MAN owned a hot dog stand. He had no education, couldn't read or write but he could talk hot dogs. All day long he told the world that he had the best barking beef in town and soon he was selling more hot dogs than anybody else. Before long he had a bankroll.

"Guess I'll send my son to college", he mused. "Don't want him to be as dumb as me."

So, his son went to college and came home for the summer vacation. Dad was still telling everybody that he had the finest hot dogs in town and cashing in heavily on his advertising.

"Listen pater", counseled Junior. "You want to watch your step. Things are in an awful mess. Russia is grabbing all she can in the East. The Jews and Arabs are scrapping all over Palestine. China is all broken up with a civil war. The stock market just went boom. It looks like curtains for Free Enterprise. Then there's the atom bomb, inflation, bureaucrats, high taxes, strikes, price control. . ."

"Gosh!", cried the old man. "I never knowed it. That's what you get when you can't read the papers and never went to school. Guess I'd better watch my step like everybody else".

So, he cut down his orders for hot dogs and rolls and he quit telling the world that he had the best franks in the town, and sure enough, business began to get worse, until the old man had to shut up shop.

But his son went back to college and the old man was happy. "An education's a wonderful thing", he said. "If my boy hadn't told me that things were in such a mess I'd still be hollering my fool head off and losing my shirt in that hot dog stand".

We have met many users of machine tools like this hot dog man. Before the war and today, they spend most of their time worrying whether business is good or bad elsewhere, what others in the same industry are charging for the same type production, and so on, ad infinitum. Always minding somebody else's business. It is wise to maintain contacts with happenings outside the scope of your own business, but your own business should come first. If our personal field experience is any criterion, those users of machine tools who stick to their milling machines and jig borers, who, in good times or bad, apply themselves wholeheartedly to sound business management based upon systematic recordings, who habitually tell the world that they sell the best products on the market, these are the men who become pillars in the business world. Some years may not be as good as others but their businesses are built on solid rock, not sand, and over the years they keep building upward.

The saga of business is replete with the names of businessmen who forged ahead in depressions while others languished for sales. The successful know that the fundamentals of business oper-

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ation, like the basic virtues, never change, that if they keep in the groove and mind their own business properly, they will make out all right in the end.

What the other fellow is doing is of limited consequence unless you permit it to influence your actions unduly. We have known users of machine tools who nursed a continual gripe against the price-cutting evil, whose minds were so enmeshed with the thought that every other producer in his field was cutting prices that they kept whittling away at their own estimates and prices until they became the worst price-cutters in the business. Be captain of your own soul in the management of your affairs. Remember the hot dog man and mind your own business.

### It's Your Own Business

Too few users of machine tools are able to mind their own business because they lack the proper business records to give them an intelligent appraisal of things that have gone before so that they can maneuver things that are to come to successful accomplishment. The other reason is rank indifference to business analysis. Yet, periodical appraisal of past performance and contemplation of future operation are as essential as dependable threading tools and die holders.

Take cost records. Many users of machine tools practically ignore them, yet, it is impossible to get a good perspective of operations without these experience figures. On current work, they give aid in setting estimates, quoting prices and appraising costs. Some users of machine tools have told us, "I know my costs because I keep books on what I spend and on what I take in, so why should I bother about cost records?" They have the mental make-up of that college boy who told his Dad that business was rotten and got pater to pipe down on his wares. Before the war, 40 per cent of the industrial failures in one year were attributed to lack of ade-

quate costing records. The financial accounts will not disclose the cost per unit of production so you should keep cost records independent of your financial accounts to tell you how much it costs you to turn out each unit of production. From an analysis of cost records over a prior period, a management can construct standards, which it may use as guides on current operation.

Stock control cards, a good system of handling credits and collections, monthly profit and loss statements, adequate recording of income and outgo apart from the cost accounting system, forms for recording withholding tax so that reports and payments to the Treasury will be accurate, budgets, etc., are conspicuous by their absence in too many plants and without them no management can say that it knows how to mind its own business.

To mind his own business properly the user of machine tools needs cost

control inside and sales control outside and this applies to large and small operators. Sales are essential to all businessmen so this element should be given intelligent appraisal by all businessmen. Some plant owners know more about the exploits of Lil' Abner than they do about the sales possibilities in their territories or sphere of circulation. The basis of sales control is a knowledge of the sales potential in your selling field. Yes, we know that sales are stymied right now for a number of reasons, but these difficulties will eventually right themselves and then where will you be if you have no idea of your sales potential? The competitor who knows will have the jump on you and there will be plenty of competition.

Wise managements have already made extensive sales surveys to screen the good possibilities so that when business gets going in postwar earnest they will know just where to go to sell their

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products or have built up customer goodwill through their sales promotion work that customers contact them. Those who have not undertaken a sales survey as yet had better get one under way because the coming year will probably witness a substantial increase in business. On the whole, over the country, despite strikes and other hectic happenings, inventories are on the increase, more goods are coming to market, sales resistance is increasing, and that means the businessman must do a better job of sales promotion now. This seller's market has put salesmanship to sleep in many organizations. It is time to wake it up.

The big thought we are trying to convey is that the user of machine tools should give some thought to what he can do in a sales way during 1947, adopt some semblance of sales control by means of a budget and not be content to take whatever business happens to come his way. He need not splurge like

a big shot to get results. If he operates a small plant, it is still incumbent upon him to utilize sales control proportionately. If it pays the big organization handsomely, it will pay the small operator likewise on his more modest investment. It is surprising how much potential business can be lined up over a short period if a management becomes sales-minded instead of accepting passively whatever business comes in the office, cataloging results systematically the same as with a costing system. Leads gathered from various sources should be recorded in a card file for exploitation when the time is right. Memory is as tricky on sales control as on cost control. Buy yourself a letter file and a card file for prospect cards, estimates, letters, tax matters, etc. The offices of too many users of machine tools, usually the smaller plant owners, look like what Hiroshima looks like now.

Cost control and sales control are fundamentals of good management. Without them, like the hot dog man, you will be led askew because you won't be able to mind your own business.

#### MASTER 24" GRINDER

A versatile 24" disc grinder, for which the manufacturer claims six exclusive features, now is made available for reasonable delivery by The Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11, O.

This grinder is adaptable to all kinds of grinding on metal, wood or plastics. The specific disc speeds required for grinding these three materials are said to be available.

Special features of the machine include a heavily ribbed, normalized and machined table; table tilts 45° down and 25° up by worm and gear drive; both faces of grinding disc can be used; circular and core print fixture has a capacity of 22" in diameter and is wedge-shaped with 10° angle. The disc will accommodate both flexible back cloth and paper back abrasives. Two models of the grinder are available. Model A is furnished with its own dust collection system, and Model B is equipped with a 4" exhaust tube to be attached to the plant system.

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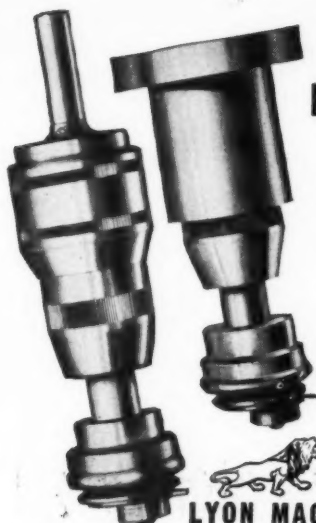
Automatic features assure identical fractional ten-thousandth precision in skilled or unskilled hands. Not a passing reading. Detects front or back taper, out-of-round, barrel shape, in addition to showing exact size of hole. For machine operators, routine inspection, laboratory checking.

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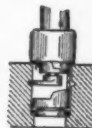


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# REMOTE CONTROL

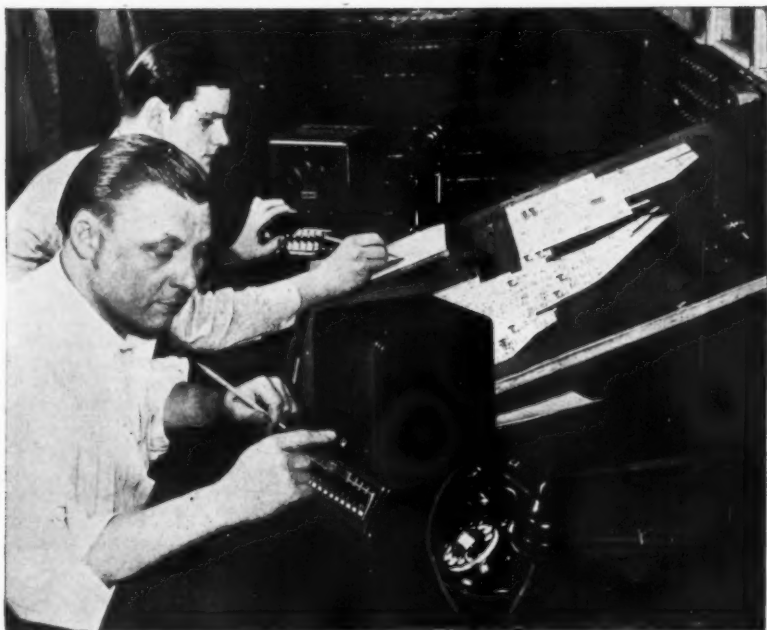


Fig. 1—Dispatchers Keep Control Record Of Each Intra-Plant Truck By Contact With All Spicer Departments Through Executone Intercom System.

## Central Intercom Control Gives Maximum Efficiency to Plant Truck Operation

By J. A. Richards\*

**T**HE SPICER Manufacturing Corp., of Toledo, Ohio, makers of universal joints, transmissions, clutches and other automobile parts, is again supplying the civilian needs of the automotive industry.

Like many large manufacturers, Spicer uses a great many power-driven trucks to convey material from one part of the plant to another, or from one department to another. This creat-

ed a problem: how to know where any truck was at a given time so that a department which needed a truck could be served on very short notice.

The plant is divided in two sections covering several acres and these trucks were constantly being lost in the shuffle. Much time was wasted by depart-

• • •

\*Mr. Richards is with Executone, Inc., 415 Lexington Ave., New York 17, N. Y.

ments waiting for material and by departments which had material to be moved out.

In simple terms, the problem reduced itself to the need of quick communication between the operators or roving trucks and a central point from which the trucks could be controlled and their operations coordinated. An "Internal Trucking Department" was set up and there were installed two separate central control inter-communications systems, one for each section of the plant. This arrangement provided an amazingly simple yet completely satisfactory solution.

The two control station boxes are located on a large desk in an office (See Fig. 1) which is designated as the truck dispatcher's office. Complete coverage of all departments is obtained through seventeen substations located at strategic points throughout the two sections of the huge plant. Nine substations in one section of the plant are connected to one control station and eight substations in the other section of the plant are connected to the other control station. Each substation is placed on a shelf and protected by a special housing as shown in Fig. 2.

A control chart, called the dispatch board, is placed on the large desk in the dispatcher's office. An outline of both sections of the plant is painted on the board and holes, drilled in the board, show the location of each department where each of the seventeen substations are strategically located. Numbered pegs are used to represent the different truck operators. When the day's work starts, the dispatchers place these pegs in the holes representing the different departments to which each truck is assigned. From that time on the dispatchers are informed regarding the location of the trucks through the inter-communication system. Each truck operator, at the completion of a job, calls the dispatcher through the



Fig. 2—Operators Of Power-Driven Trucks Originate A Call To Dispatchers' Office Through An Executone.

nearest of the substations and reports that he is ready for another assignment.

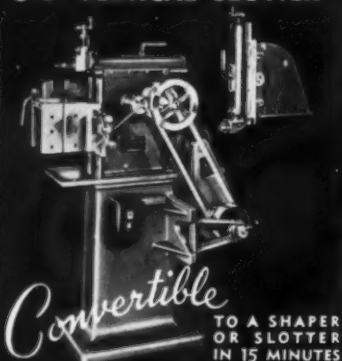
Two men are required to man the dispatch office because of the many calls for trucks being constantly received. Should a truck get out of order or need attention for any reason the truck operator informs the dispatchers office. If it is a minor matter and the truck can remain in operation the repairman goes to where ever it is. In the case of a major repair the truck is taken to the shop.

At the end of the day, all of the trucks go to one point, known as the truck pool where they are checked and serviced. In the morning, each driver takes his truck to the substation to which he is assigned.

To illustrate how the system works,



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suppose Department 17 needs a truck. The operator at the dispatch board uses his Master station to call the truck which is nearest to Department 17. The peg, bearing the number of the truck operator, is then placed at Department 17. As soon as the driver completes his work, he goes to the nearest intercom substation and reports to the dispatcher's office that he is ready for another assignment.

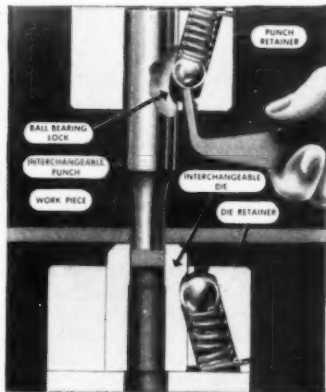
The Spicer Manufacturing Corporation believes in the old saying, "You can't make money driving an empty wagon." They have practically eliminated "empty" driving, particularly on long hauls. Much time is saved, efficiency is increased and over-all truck operations made possible by the intercommunication system.

The Spicer installation was made by H. D. Hughes of Cleveland, and illustrates a service being offered to organizations using intra-plant trucks, by Executone, Inc.

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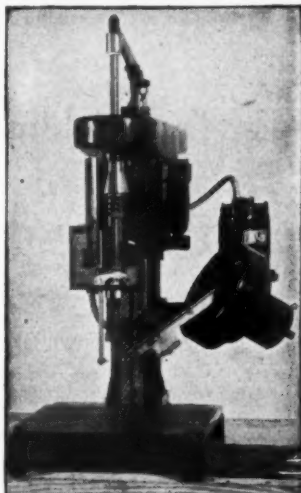
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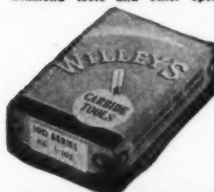


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# Joint Preparation and Fit-Up For Welding

By L. K. Stringham\*

The closely related factors of preparation and fit-up of a joint for welding largely determine the cost of a given structure as well as its value in service life and performance.



Fig. 1—Steel base designed for welding.

**P**REPARING and fitting up joints for welding has long passed the theory stage. Today there are definite tried and proven methods in use which have become standard practice in the field of welded design.

It is common knowledge that foreign matter such as corrosion, oil or water tends to make the weld more costly because of the added difficulty in

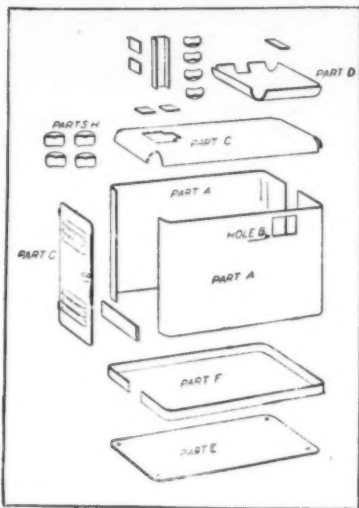


Fig. 2—Component parts of self-supporting base.

making the weld, therefore preparatory work should include the cleaning of the work prior to actual deposition of the weld metal. This is elementary and is only one phase of the preparation for welding.

Probably the simplest way to outline the various steps necessary in work preparation and fit-up is to make an analysis of a typical structure designed for welding. The machine base shown in Fig. 1 will serve as an example.

In this structure, the majority of the material is steel plate of 3/16-inch thickness. Preceding actual fabrication, two basic designs were considered, one of which involved lighter material. It was decided, however, that the base should be self-supporting, therefore the idea of lighter material with added structural members for support, was discarded.

\*Engineer in Charge of Welding Applications, The Lincoln Electric Co., Cleveland, O.



Fig. 3—Main body member showing location of weld for quantity production (No. Y) and for limited production (No. Z).

The main body part (See "A", Fig. 2) may be prepared in two ways, depending on the number of bases to be built. The two methods are illustrated in Fig. 3. If only one or a few bases are to be made, method No. Z is advantageous since the joint to be welded is near the corner and the possibility of distortion is minimized. Where a large number of bases are to be made, method No. Y is superior and the use of a jig is indicated for holding the two identical parts firmly to prevent distortion.

The type of butt joint selected for the main body part requires no preparation other than fitting up so the space

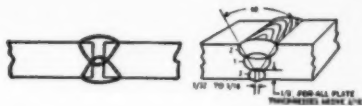


Fig. 4—Simple square groove butt weld joint, welded both sides. Fig. 5—Single vee butt joint with shoulder.

between the joint edges is approximately 3/32-inch apart. After tacking the two parts into position they are later welded solid all around from both sides. A cross-sectional view of this low cost type joint is shown in Fig. 4.

Variations of the square grooved butt joint as mentioned above are the single vee (Fig. 5) and the double vee (Fig. 6). Such joints may be prepared for welding by bevel shearing, flame cutting or planing, depending upon equipment and facilities available.

Following a welding sequence set up for a limited number of bases, the bottom plate (See "E", Fig. 2), should be



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Fig. 6—Double vee butt joint. Fig. 7—Simple tee fillet joint.

fitted and tacked into position. The completed weld is a very simple tee fillet joint such as shown in Fig. 7, and is desirable from the standpoint of economy of fit-up.

The top, (See "C", Fig. 2), is next fitted for size if required and tacked in position before finish welding.

Preparation also involves flame cutting the rounded corner parts (See "H", Fig. 2), to the correct size and tacking the corners into position from the inside so that they are flush with the outside.

After welding the main structure all around with general purpose electrode, the hinges are welded to the door with

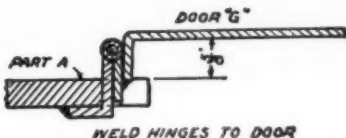


Fig. 8—Pin type hinge welded to door of machine base.

simple fillet welds (Fig. 8) and this sub-assembly is then fused to the sides of the machine base in a flat position. This is a fillet lap joint and requires no preparation or fit-up other than locating the hinges in prepared positions.

If for any reason, such as lack of equipment, the forming of the bottom strip (See "F", Fig. 2) so that it will fit snugly around the base is prevented, a small fillet weld deposited around the top of the strip will result in excellent appearance.

In addition to the preparation and fit-up for the aforementioned joints, variations in design or structure may call for other types of joints such as flush

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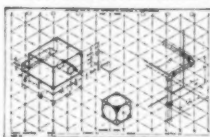
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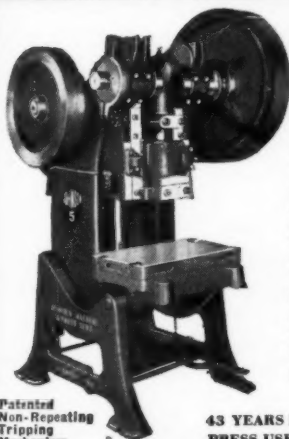
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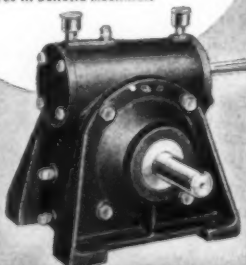
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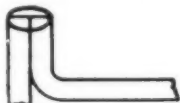


Fig. 9—Flush corner joint. Fig. 10—Half-open corner joint.

corner joints (Fig. 9), half open corner joint (Fig. 10), full open corner joint (Fig. 11), or edge joint (Fig. 12).

In any type joint which may be dictated by the design to be welded, preparation and fit-up should be given careful consideration as these factors not only affect the cost of fabrication, but also the performance and service life of the finished product or part.

Fig. 11—Full-open corner joint. Fig. 12—Edge joint.



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# Shop Hints

## Rebuilding a Lathe in Your Own Shop

By Andrew Wyzenbeek\*

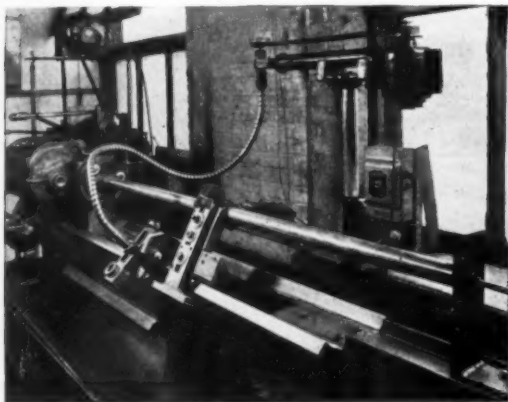
**T**HE necessity of speedy production during the war caused us to abuse many of our machine tools in a way that we would not think of doing during peace time operation. One of our W & S screw machines which had been used continuously on one set-up is a good example of this. This machine had a spot on the bed where the carriage had scored it badly and worn a space of about 10" long more than  $1/32$ " low. The turret slide also had scored and worn the bed so deeply that rescraping the ways was out of question.

The machine had become useless, unless a replaning job was done, but this entailed an expense we felt was unjustified, considering the age of this machine.

We then conceived the idea of regrinding the bed without dismantling the machine or removing it from its place.

A bar of ground and polished shafting, 2" in diameter and about 18" longer than the lathe bed was mounted in the spindle of the turret lathe. An extension was bolted on the end of the lathe, having an angle bracket mounted, with a movable center, to support the end of the bar. The

bar normally took its position over the center of the bed, but needed to be indicated with a height-gage from an un-worn machined surface on the underside of the front Vee, to locate the supporting center and compensate for sag of the bar. A casting was fitted to slide on the bar and a bracket was welded up, with a long straight edge to bear on the un-worn machined surface under

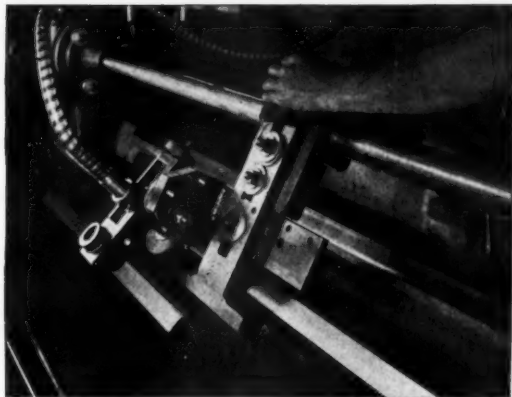


\* \* \*

\*President of Wyzenbeek & Staff, Inc., Chicago, Ill.



Note casting fitted to slide on bar. The bracket has a long straight edge to bear on unworn surface.



the Vee. Then an angle bracket was mounted on this slide, having a swivel-fixture holding the ball bearing spindle of a Wyco flexible shaft. A 4" cup wheel was mounted on this spindle and the face dressed with a diamond clamped along the bed.

The flexible shaft machine used in this case was a radial type, overhead suspension model, as this would freely swing with the movement of the slide offering the least resistance, however, a floor type model flexible shaft machine

would have done the job equally as well, had we had sufficient room to set it in front of the machine.

The front Vee was finished first, holding to the original angle of the Vee and then the opposite side was finished, checking the angles with a template which was made from an un-worn spot of the bed before the job of regrinding began.

The finished job is surprisingly accurate and presents a fine ground finish requiring little hand scraping. The



The grinding operation on the front Vee. This operation holds the original angle of the Vee.

bed is now in perfect alignment with the spindle and a minimum of stock has been removed. This eliminated the need of taking a cut off the top of the apron to compensate for the lowering of the bed surface.

The job of regrinding took less than four days,—an expenditure well justified

as this again puts the lathe in operation to produce accurate work.

We expect to refinish several other machine beds this way in our shop to compensate for the ravages of continuous war work rather than discard an otherwise perfectly usable machine tool.

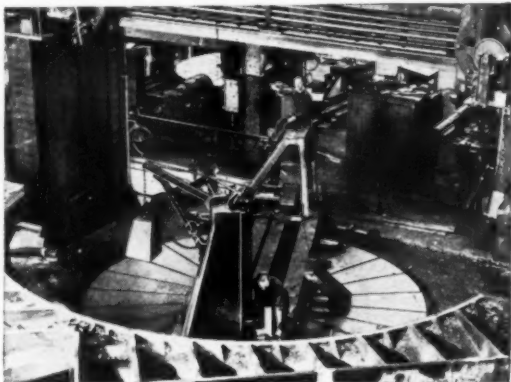
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### RECONVERSION OF A BORING MILL

How a time-worn machine can frequently be reconverted in a simple manner so as to meet present day production demands by means, other than replacement, of aging parts, was illustrated recently at Dominion Engineering Company, Ltd., of Lachine, Quebec.

Their big 35-ft. boring mill, after many years of service, finally showed signs of failure in the table drive gearing. Rather than replace the gears with the same type, it was decided to reconvert and use Cone-Drive gearing (produced in the U. S. A. by Michigan Tool Company, Detroit).

This gearing has the advantages of more teeth in contact and more surface of each tooth in contact than was previously had, making it possible to transmit more power for given size of gear-set. The result was that the boring mill now takes much heavier cuts. An unan-



anticipated additional result was the surprisingly smoother operation of the mill even while taking the heavier cuts.

Everybody was so pleased with the rejuvenation of the big job that plans are now under way for reconvert Dominion's 20-ft. boring mill using Cone-Drives, rather than the former types of gears.

---

### PACKAGING

A service thru which manufacturers will be able to plan packages for new products is being offered by the Wirebound Box Manufacturers Association despite the current shortage of veneer which is hampering box production.

The new plan will enable manufacturers to gear their designing and engineering of containers for future products to the development of the products themselves. When a new product is ready for marketing, the container designing will have been accomplished. This, in turn,

will permit advance scheduling of container production, a safeguard during periods of critical container material shortages.

It was pointed out that the wirebound engineering service will save manufacturers time and money by minimizing the need for "trial and error" experiments in shipping to find the most practical package for their products.

Further information may be obtained from Dept. BB, of the Association at 43 E. Ohio St., Chicago 11, Ill.



## PREVIEW YOUR 1946 TAX RETURN NOW

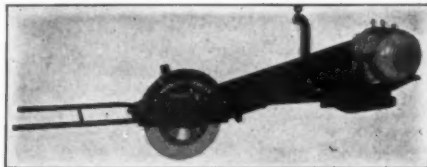
By Arthur Roberts

**N**OW IS the time, before the year rolls away, for the maker and user of machine tools to give thought to recordings in their relation to income tax regulations. This should be done in order that his books line up with regulations, so maximum economies can be effected. Too many taxpayers wait until filing time to size up their transactions for the year from the standpoint of taxation. Then they find that they have handled certain phases of operation, or certain business deals, in a way that prevents the claiming of maximum deductions, or washes them out entirely on deductions. When filing time comes around these taxpayers can do nothing about it because the Treasury Department seldom permits a revision of records for a prior year, nor is it possible to adjust the procedural phase of

a transaction after consummation in order to square with tax regulations. Once the year is closed and transactions recorded, the tax return should reflect these recordings, so it is wise to consider every transaction and the recordings thereof during the taxable year. In other words, the user of machine tools should preview his 1946 return this year, not review it next year. **Get The Facts Now**

Many taxpayers do not call in their accountants to prepare returns until February or early March following the taxable year. It would be better to confer with these accountants toward the end of the taxable year to make sure that all recordings are in proper shape, that transactions have been handled in line with regulations, that maximum savings have been effected.

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Before the year's close, in some cases, adjustments may be permitted, which would be disallowed the following year, or deals could be handled in such a way as to cut the tax. There is nothing wrong about taking all the legitimate deductions to which you are entitled under regulations. If the records show income and outgo accurately, a taxpayer is not considered a tax evader if he files in line with regulations. There are a number of borderline cases in the tax law whereby a taxpayer may pay less if he files one way, and more tax if he files another. In most instances, he may take the interpretation that gives him the most tax benefit. Counsel with an accountant during the taxable year may reveal tax economies along these lines that may run into substantial sums, and moreover, the accountant would have more time to mull over the books and do a thorough job. Too many taxpayers call in an accountant at the last minute and authorize him to make a return based upon book figures. If the figures are wrong, if recordings or transactions have not been handled to best advantage from the taxpayer's standpoint, the return may be correct in accordance with book summaries but behind the figures may lurk certain discrepancies that should have been corrected and if these discrepancies work to the disadvantage of the taxpayer, he is out money.

Space does not permit detailing all cases of this kind but we offer a few examples so that you get the idea.

### Repairs and Improvements

Many users of machine tools will soon be making repairs and improvements. Be sure to differentiate between them, not only on the books, but when the contract is let for the job, because if repairs and improvements are made at one time and the contract is let as one job, the repairs are not deductible. Either make your repairs at one time, improvements at another time or get

separate bills for each class of work so that there is no question of your right to take the deduction. After the deal has been closed and the recording made, you can do little about adjusting the matter at filing time so that you can get a deduction for the repair work.

#### Rent Deductions.

If the taxpayer leases a property for business purposes, any improvements he makes must be capitalized but if he can arrange with the landlord to consider such improvements as a rent reduction, the taxpayer may be able to deduct the cost of the improvements as rent. A partially worthless debt is deductible only in the year when charged off, not in the year it becomes partially worthless, so charge off a partially worthless debt when it will provide the most tax economies. Unless you take such things into consideration during the taxable year and make the necessary recordings, you may not be

allowed to enter such items as deductions on your March 15 return.

#### Equipment Disposal

Business property can be abandoned and the loss taken as a deduction but abandonment must be proved. The taxpayer cannot stand equipment in a corner and write it off as abandoned, yet, have a vague feeling that he may have use for it some day in a pinch. The equipment or the property must be disposed of in some way or sold for its salvage value.

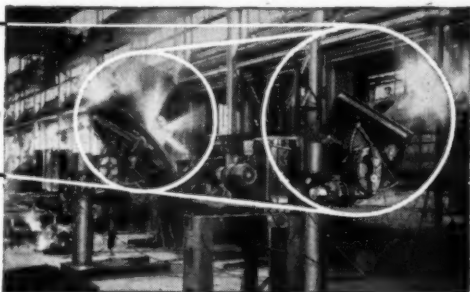
Gains or losses from the sale of real or depreciable property used in business and held for more than six months are capital gains, if the gains exceed the losses. If the losses exceed the gains, they are ordinary losses deductible in full so it pays the taxpayer to dispose of all unwanted working units during 1946 and not hang on to them indefinitely so that he can get the benefit of substantial tax relief while the tax is

### More WELDING going on here.....

More welding and less time spent in flopping, propping up and crawling around weldments is the end result of the C-F Positioners in this welding department.

Mounted on C-F Welding Positioners, weldments can be quickly brought into position for a downhand pass—better, more uniform welds with resulting economies and production increases follow. Weldors spend more time welding when they work with C-F Positioners because one "set-up" on the table allows them to maneuver the job without assistance, whether hand or power operated. Positioners are used.

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**BEAR**  
COMBINATION

STATIC AND DY-NAMIC BALANCING MACHINES

high. As the tax rates are reduced, the savings from such deductions will be less. Users of machine tools should take inventory of their working equipment this year in order to write off those units that are no longer of use in their operations. If these write-offs are in line with regulations, the taxpayer will benefit financially, but the action should be taken, and the recordings made before the books are closed for the taxable year.

#### Trade-Ins

In some cases, trading in old equipment for new offers tax economies. For example, if a machine is shown on the books at \$2,000 value, and the trade-in price is \$1,000, the loss of \$1,000 is deductible if the taxpayer sells the old equipment for cash and records the transaction as such, then buys the new equipment. If he effects a straight trade-in transaction, the loss is not deductible. Unless the transaction is handled in line with regulations during the taxable year, the taxpayer is not likely to get the deduction passed.

#### Advertising Deductions

Some taxpayers discontinued advertising during the war and set up a reserve to promote sales in the postwar period. The credits to the reserves were offset by charges to profit and loss but the amount was not deductible as a tax expense. When the taxpayer starts spending this money for advertising, he may deduct it in the taxable year, but it is only deductible as spent. However, inasmuch as profits were already charged during the war years, this money should now be charged to the reserve to offset the credits on the books. During the war, the Treasury Department checked advertising deductions carefully and passed them only if they seemed reasonable because, under the high tax rates, the cost of advertising to the advertiser is cut considerably, sometimes taxpayers in the

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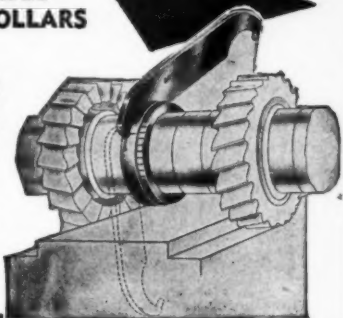
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high brackets may pay only 30 cents on the dollar for the white space they buy. They pay 70 cents on the dollar to the government if they don't spend it, so if they spend the dollar for advertising, the net cost is only 30 cents. For this reason, the government insists that the advertising deduction be reasonable. As long as the tax rate remains high, the Treasury may continue this attitude. Advertising is a permissible deduction if you can show that the outlay is needed to maintain prestige and goodwill and to take care of sales that can reasonably be handled by your plant or the expansion prospects you have in mind.

#### Expenses

If work done on property is needed to keep it in ordinary efficient operating condition, it is a repair and may be deducted as an expense. Never capitalize such items, repairs, property taxes, interest, etc. that are legitimate ex-

penses. They may increase net worth on paper but eventually they will have to be written off against profits and then the taxpayer cannot take the deduction and therefore pays more tax. However, if work done on business property or equipment is in the nature of a replacement that prolongs the life of the asset, it should be capitalized and the deduction taken over the years as depreciation. In some cases, this outlay should be charged against a reserve for depreciation if the taxpayer has established a reserve for this purpose.

#### Keep "Water" Out

In former years, users of machine tools sometimes capitalized expenses, thereby increasing the value of their assets. This produced a bigger net worth on paper and was usually handled this way to "water" the balance sheet for creditors or to present a better financial picture to the banker when applying for a loan. When the tax was low, the losses entailed through not getting such deductions on the tax return were limited, but today, with the topflight tolls, capitalizing such recordings may mean substantial losses.

The basis of tax economy is accurate recording. The taxpayer who relies on memory or slaphappy records, may overlook many opportunities for legitimate deductions. All purchases may not be recorded, which will increase the tax, and lacking adequate records, the taxpayer lacks adequate proof and the Treasury Department may disallow a deduction, even tho in the taxpayer's mind, he is certain he is entitled to it. Accountants covering all fields report that many taxpayers have had to pay higher taxes because they could not substantiate the figures on the tax return with adequate recordings.

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# THE FOREMANSHIP FORUM

By Edmund Mottershead

## The Seeing Eye

**A**MID THE myriad problems of our time, with changing conditions, tottering social institutions, rising bureaucracy, war and general disruption of family life, we certainly see through a glass darkly. Particularly is this true when we consider the real issues of the day, looking for a solution to our problems. From the standpoint of the foreman in industry, whose job is changing in character from day to day, one quality is perhaps of greater importance in making for the successful performance of that job than any other . . . vision.

Many of our present foremen are individuals who have come up through the ranks in industry, and have behind them half a lifetime of meeting the problems of production and handling men. But the conditions of production have changed. The nature and quality of the workers have changed. The foreman is no longer the high handed "boss" of his department, but rather the middle man between labor and management. He is, if anything, as much a professional man as the engineers and time study experts, the cost accountants and labor negotiators. Many of our older foremen are not entirely aware of this fact, do not completely appreciate the changes in their situation and function. Many of the younger men who have become foremen in the last five years are steeped in the previous tradition, and have the same lack of understanding of their basic problems.

Not only the industrial foremen, but most of the rest of us have gotten into a mental rut from which it is impossible to grasp and control the realities of life around us. Our industrial society today has outgrown and broken down the social and economic controls of the pre-industrial social organization within which it developed. But we are still trying to meet these issues with habitual techniques, still reacting to the conflicting desires of labor and capital with habitual emotional patterns, still kicking about the fact that the "good old days" are gone. Much of our thinking is reactionary, a conscious or unconscious attempt to restore what has already disappeared, and even if we could restore the foreman to his rightful place as "boss"; even if we could restore the economy of the past generation, those techniques and methods would fail to handle the situations which are today the industrial reality.

The same thing holds true to a very large extent on the production line. Needs have changed. Materials and methods have changed. The high regard which the skilled artisan commanded is disappearing, and instead of realizing that the fundamental industrial labor demand is for precision performance of simple repetitive operations, foremen and management alike bewail the stupidity and indifference and general ineptness of the labor they find available.

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The old order changeth. We have put the new wine in old bottles, and it is now at the bursting point. This mental staleness as far as objective realization of the facts around us is concerned leads not only to disruption of production as such, but for the individual, it leads to a failure to understand the purpose and meaning of his own life. It leads to the bewilderment of the unemployed who, finding life chaotic and unreasonable, put their last quarter on a lottery or a horse, feeling that the Gods of Chance were perhaps the only rational element in the universe. Not that things are really as complex and chaotic as they appear, but the mental rut, the continued failure to observe reality, is behind the difficulty.

It is this fact which lies behind the ability of the efficiency expert. Not that he has so much greater skill or knowledge or intelligence, not that he has even half as many years of experience as the men whose plant he is surveying, but . . . coming in from outside the immediate situation, he has a freshness of approach; he is not hampered by habitual thinking; he is not bound by the traditions and morals of the local group; he sees things as they really are and recommends action accordingly. His action is much the same as the young man who goes to work on a job and determines that he will do something. Everyone says it can't be done. He does it . . . apparently because he doesn't know enough to realize it can't be done. A certain amount of ignorance apparently has its advantages. Most of our great inventors were men who had some other profession or occupation; their inventions were more or less hobbies at the start; their formal education and training had for the most part been in other lines.

However, it is not partial ignorance which gives a man the ability to analyze a problem and get results. Had the traditional chemists and physicists with

their scientific training had the same quality of vision of a Watt or a Morse or of the Wright brothers, it is conceivable that the inventions themselves might have been different or better. As it is, these same men, once the vision is opened to them, have made such technological improvements on the original model that its inventor would be hard put to recognize it. The ability, the mentality, the skill and technical knowledge, the strength and determination and willingness is all there. They lack only the vision. Similarly in industry. The foreman with thirty years experience in a given shop has a store of knowledge and accumulated wisdom which is of enormous value; yet without the vision to understand and analyze modern problems and conditions, its value is lost.

What is vision, how can we recognize it; how can it be developed or acquired? As a starting point, let us describe it a bit. Vision of the kind re-

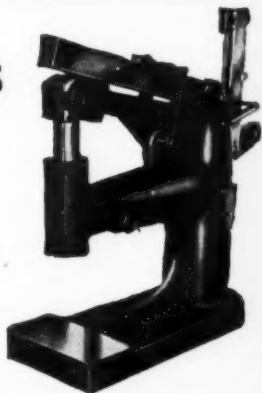
quired to cope with our problems has three basic characteristics: 1. It is contemporary. 2. It is objective. 3. It is fundamental.

When I say that vision must be contemporary, I mean this: the only starting point we can have in either thinking or action is the present. We are what we are and where we are. Facts around us are what they are. We cannot bring up the past and impose it on the present; neither can we take some abstract and hypothetical starting point in the future and go on from there. The past is gone, and even if revived, it would not be the same as it would not be in the same social context. The future has not yet arrived, and by the time we get to our hypothetical starting point, conditions may have changed so radically as to render our planning useless. Not only that, but our thinking should be in the language of the present. The Republican of Lincoln's time, the Republican of Theodore

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Stroke	2"	2"	2 1/2"
Spindle	1"	1"	1 1/4"
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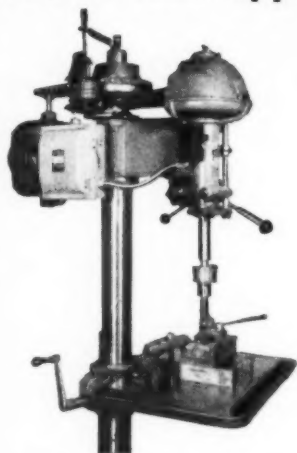
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Roosevelt's time, the Republican of Harding's administration, and the Republican of today represent different things, and stand for different principles. While the same words are used, they mean different things. The symbols remain, but their essence has changed. The fact that the New Deal is neither liberal nor new, but rationalist liberal, in plain words reactionary; the fact that the conservative who stands for freedom is in reality the modern liberal; these and other instances only mean that our thinking must not be beclouded by the terminology and definitions of the past. It is perhaps unfortunate that the mass of people are not articulate about their social and political desires. They know clearly what they want, but cannot express it. The "clever" political or economic leader articulates these desires, coins a phrase or a slogan, and rises to power as the representative of the people's most cherished hopes, whether he satisfies those hopes or not. Vision must be contemporary. And the foreman who is not contemporary in his thinking, taking the facts of the present and looking to the future instead of looking back longingly to the past and regarding the present with bewilderment, must first make the effort to make his thinking contemporary.

When I say that vision must be objective, I mean simply that facts are hard, amoral, indifferent realities, and that there is no sense to beating your brains out against the stone wall of reality by persisting in wishful thinking. That leads only to those disappointments and frustrations which are not only painful personally, but which have significant social and economic results. If a man does you an injustice, you tend to dislike the man, not differentiating in your thinking between the man and his actions. It is possible to get along with the man, and even like him personally, without liking or being satisfied with his actions. The foreman

# Diamond

# HAND

# LAPPING HONES



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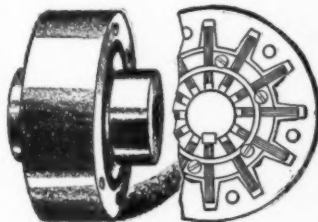


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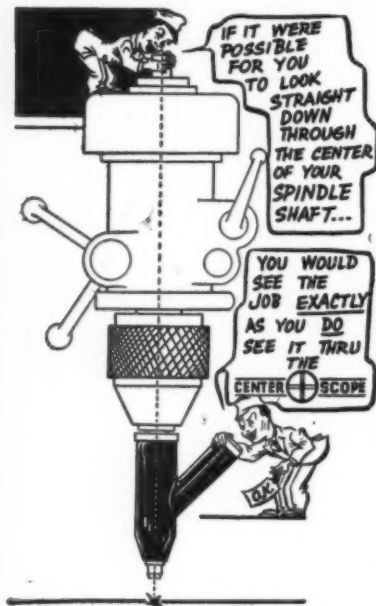


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is dissatisfied with the efforts of the workers. They are lazy or indifferent or careless or clumsy . . . or any one of a hundred other faults they can have. So he personalizes his dissatisfaction and is irritated at the workers themselves instead of confining it to their performance, and there is a vast difference. The performance of workers as distinguished from their personalities is as much an amoral factor in production as machinery and equipment. When vision is objective, the realities can be seen and understood for what they are.

When I say that true vision is fundamental, I mean simply that it cuts down to the roots of the matter instead of skimming along the surface. It puts thinking in terms of objectives and basic principles instead of immediate emotional reactions or opportunist solutions to events. Opportunism is necessary, in that all possible situations resulting from the present are not foreseeable, but "muddling through" pure and simple has definite limitations. The general staff of any army of any country in the world spends most of its time working out "possibilities" of action against this country or that, in this, that, or the other field of action, using many different combinations of strategy, tactics, and force. Thus, there is at least some kind of answer prepared long in advance for almost any question that might come up, and while the reality that eventually will confront us may be none of the anticipated ones, we have at least gone through sufficient thinking and have become sufficiently familiar with basic principles and with the factors in the problem to arrive more quickly and accurately at the solution to that which is before us. Such thinking is only possible when vision is fundamental, continually gets down to and springs from the basic objectives and principles of our lives and society.

There are three other things about vision which we must keep in mind.

Vision as a quality of thinking is as much a tool as logic or mathematics. As such it is amoral, without value except as it is used and appreciated. Vision must therefore have a definite objective to have value or significance. And having an objective, vision must have consistent and continuous follow through in execution in order for there to be accomplishment.

In determining the objectives of vision, we may say that as far as the individual is concerned, he may have both personal objectives and social objectives. And he will have immediate and long run objectives.

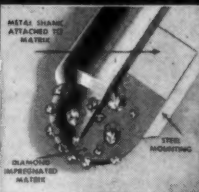
The foreman, for example may have personal objectives of security, of increasing his income, in rising still higher in the ranks of the organization. His long run objective in this is to perform his job in such a way as to get results that are more than satisfactory and attract the favorable attention of his superiors. His immediate objective may be to see that production for this particular week gets back to schedule, or to see that a certain number of workers are trained to a given point of efficiency, or some other practical matter.

At the same time, the foreman may have social objectives . . . for example, that society be so organized that he and the firm he works for, may continue to do business. His immediate course of action may be to get out production to satisfy the demands of the present. His long run course of action may be to try to educate the workers under him to an understanding of the philosophy of that organization which will maintain harmonious labor relations and build loyalty.

Immediate objectives may be planned or planless, opportunist or based upon principle. We have already touched upon the limitations of opportunism which is based upon no principle, the effects of a lack of planning. Nor do we mean that planning shall become a

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fetish, rather that "plans" shall consist of reasonable and careful consideration within the framework of some fundamental principle or principles. When we do this, we find that our immediate objectives are inevitably bound up with our long run objectives, and that our decisions of the moment are founded in fundamental principle and ideology.

Foremen who read this may think that considerations such as those that have been mentioned are beyond the range of their needs and abilities. But again, whether their social or personal aspirations have been articulated by them, or not, the quality of vision, contemporary, objective, and fundamental, is essential to their successful performance of their job. For that vision to be effective, it must have an objective, and the long run objective which is of major importance gets down to fundamentals, both personal and social.

In considering that long run objective, whatever it may be in each individual

case, there are certain fundamental considerations which establish a framework of principles within which such objectives must be realized.

One is the nature of man. Man is imperfect. Man is ignorant, lacks understanding, does not recognize the truth when it is before him. Any foreman will admit that man is imperfect . . . as witness the workers he has to put up with. At the same time he tends to expect perfection in automatic performance. The fact is that man is incapable of perfection, and can only achieve relatively good or relatively poor performance as deviations from a norm which may be arbitrarily established or which may be more "scientifically" established through time study or through analyses of past performance records. Consequently, in dealing with man, the first thing that must be realized is that perfection cannot and must not be expected. The next thing to realize is that not only does the fore-

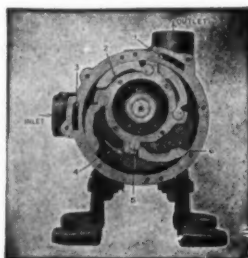
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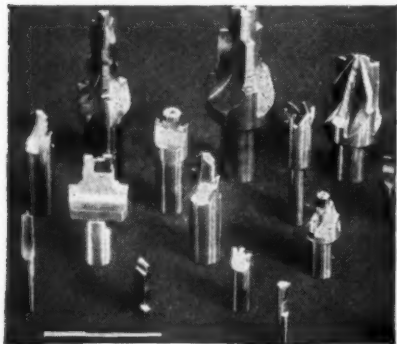
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man himself as an individual demand the respect for human dignity . . . recognition of himself as a human individual of value simply as a person . . . but the workers also have that feeling, and must be treated as human beings entirely apart from their performance or position in the organization.

Another consideration upon which to establish long run objectives is the nature of industrial society, or as a starting point, the nature of any society. We say that society must be organized. That society must be "free". That society must be integrated. What we mean is that society, our or any other, must embody two things: the determining power in society, political or economic or otherwise, must be legitimate; it must derive from some socially accepted source. And society must be so organized as to give the individual status and function . . . a place and purpose of appreciable and recognizable value. Legitimate power is controlled, because it derives from a basic source which is generally accepted, and is exercised by the consent of that source. The power of a government bureaucracy, removed from the voters and from the control of the courts, is illegitimate and uncontrolled. The power of professional industrial management, removed from the control of the owners, because the stockholders have abdicated their participation in control and are only interested in the income from their shares, is uncontrolled and illegitimate. The power of the labor union executives, which arose as a counterpoise to the power of industrial management, is uncontrolled and illegitimate, because the union leadership exists and runs the union simply because labor has passed the buck of responsibility and participation in solving labor's problems to that leadership. When we say that the industrial society must give the worker status and function, and look at what we have today, we find that the worker

has only function . . . the function of a poorly constructed machine, operating erratically and inefficiently. He must somehow have status, a place or recognition. When Dale Carnegie and the other personality specialists, on how to win friends, rose to fame and affluence, they did it by appealing to a basic desire within people for recognition. This desire for recognition must be satisfied within the organized pattern of society, and must not be just the opportunist technique of one individual dealing with another for selfish reasons.

So far we have examined vision as a mental tool. We have seen that it must be contemporary in language and thought, that it must be objective and realistic, and that it must be fundamental. We have recognized it as a tool without significance until there is an objective, either personal or social, either immediate or long run. And we have seen that the objectives of either type are inevitably bound up in the

long run social objectives which rest upon a basic understanding of the nature of men and the requirements of an organized working society. Having seen, then, something of the nature and operation of vision, we come to the next consideration: how may we acquire it?

The first thing is fundamental in any learning process: start with a strong desire. If you want sufficiently to learn a thing, you will eventually learn it. If you sincerely and strongly desire vision . . . the ability to see reality clearly and understand it, you have taken the first step.

The second step is to clarify your objectives. This is essential in order to give meaning and value to the vision you hope to attain. It may very well be that as time passes and your ability to see reality clearly increases, you will also see that your objective is not quite right and have to change it accordingly. But that is of no consequence as far



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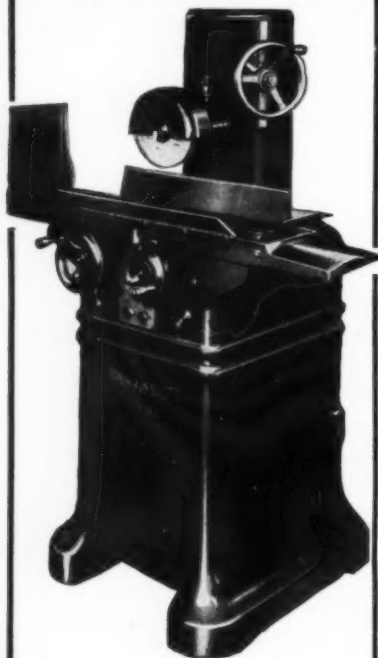
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as acquiring vision as a tool of thinking. The important thing is to have the objective in order to have a basis of the self discipline which is required. A certain humility and openmindedness is essential, and that is perhaps one of the most difficult of all mental disciplines, to be sufficiently open minded that you can get all the facts before making a judgment.

The third step in acquiring vision is the same as in learning any new skill or body of information: clear out the obstacles. Your own individual obstacles may be different from the next man's, but they very likely fall somewhere into one of four categories:

1. You may feel that you are too old. You can't teach an old dog new tricks, etc. This is largely nonsense. The investigations of Thorndike and his associates demonstrated that between the ages of twenty-two and forty, the ability to learn a subject such as a language or mathematics declines no more than one per cent each year. A man aged forty-two is only twenty per cent behind a man twenty years younger, and this does not mean that he will fail to learn . . . simply that it will take a little longer span of time. Not only is there just a small lag in learning as age advances, but age itself, with wider experience and more maturity, together with sufficient life experience to appreciate the value and significance of what is being learned gives the older person certain advantages in learning that the younger never can have.

2. You may feel that you simply have not the ability. This is possible, as it is possible that now, after thirty years of mechanical work, your hands may have stiffened so that it would be impossible for you to play the violin as well as Heifetz. BUT, go back the thirty years. How many of your abilities and inherent capabilities have been neglected and lost in the passage of time because you continually had to do what

was right before you and ignore the rest? How many of your abilities were lost because your teachers or leaders or associates overlooked them, trained you along other lines, guided you into different channels? The only way to find out if you really lack the ability for clear cut vision, is to do everything in your power to acquire it.

3. You may think you have not the time for study. The acquisition of vision is not something which requires study in the normal or academic sense of the word. What is required is the mental discipline of the open mind, of the perpetual question, of the never ending self supervision and check up. What is required is constant daily observation through the eyes of someone who never saw that particular event or place or person or machine before. Practice and learning in the acquisition of vision do not require more time than the ordinary pursuit of life's activities.

It is a part of that activity. It is not a study, but an outlook.

4. You may think that you can find no teacher. You may say that vision is lacking in those about you. There is no one in your organization, among your friends, from whom you can learn. This is no problem. Vision is self taught, self acquired, and is something which becomes a part of you, mentally and psychologically.

The fourth step is method. Having the desire, having stated your objective (preferably in writing), and having reduced your own objections to the effort of learning to nothing, you are ready to undertake the learning process itself. The essence of acquiring vision is to use a little imagination, to look at everything as though you had never seen it before. It goes back to the reason why the efficiency expert is an expert. It is because he has not only certain skills and knowledge, but a

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fresh and unprejudiced approach to the problems within the plant he is surveying. He sees things as they really are instead of as they have been for the past thirty years or as they might be if this or that had happened ten years ago or even as you wish they were.

With this use of your imagination, this fresh approach to reality, goes the questioning attitude. Kipling's little verse expresses it:

"I have six honest serving men;  
They taught me all I knew...

Their names are what and why and when,

And how and where and who."

When you get to the point of seeing things as they really are, you continue by questioning yourself how they got that way, why they are as they are, where and who and when. Question. Question. Question. And don't stop until you are satisfied. Vision must be objective and fundamental, and contemporary in expression and language.

Finally, there are aids to the acquisition of vision, just as there are aids to the study of any subject. Take the half hour each morning going to work and the half hour or so spent returning home as periods of reflection and review. Going to work review yourself, your attitudes, see that your mind is open as you approach the problems of another day; put yourself in the right frame of mind to permit the exercise of whatever vision you have already. On your way home check over what you did during the day. Were you able to differentiate between the people and what they did? What was the real cause of the trouble on the line?

If you really want to be thorough, it is well worth the effort to take a half hour at home in the evening and write in simple narrative style what you saw and did during the day. What happened. The style of the newspaper reporter, stating the facts simply and clearly,

concise, to the point, is the style to use. And even if you find it laborious to write, difficult to get the right word on paper, that effort in itself will help to clarify things for you. I once tried an experiment with a group of foremen in a training program. The men had been meeting once a week to discuss and study various problems, and they were supposedly preparing their talks at home before the meetings. Some prepared their talks, many did not. So for several sessions I had them come to the meeting without preparation, and then spend the first half hour or so writing down their ideas. It was remarkable the improvement in thinking and clarity of expression that resulted.

In summation: to acquire vision you first have a strong desire to see clearly and understand what goes on about you. You state a definite objective to be realized through that vision and understanding. You remove your own objections to the effort of learning and

create the proper conditions for learning. By using your imagination with an open mind, you attack life with a fresh view. And by conscientious review, self analysis, and self discipline, you follow through with your learning step by step.

Ernest Dimnet, in his book, *THE ART OF THINKING*, a best seller for many years through the help it has given millions of men and women, says, "What is it that characterizes the thinker? First of all, and obviously, vision: The thinker is pre-eminently a man who sees where others do not." The seeing eye of vision, contemporary in thought, fundamental in analysis and objective approach, is the most needed mental tool of the day, and it is only through vision, coupled with personal integrity and definite purpose that the problems of the day may be solved. Foremen already occupy a key position in industry. In our industrial society, their position can become more important to social



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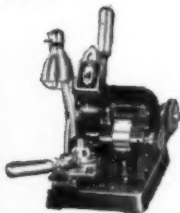


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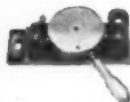
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integration as well as to personal satisfactions and security . . . if they will make it so. The post war world will bring with it a demand for new leadership, for leadership with a clearer understanding than any we have today, for leadership with the courage and integrity to handle the tasks before it. I recommend to foremen in all industries, of all ages, that they ask themselves whether they actually see what is before them. If not, why not? And why not do something about it. The time for post war leadership to assert itself is now, before some other leadership, without the experience and ability foremen as a group possess, takes advantage of circumstances, make articulate our social desires, and gives us as a nation another tawdry bill of goods in place of the real solutions which experienced industrial leadership can provide . . . with vision.

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A new multiple lever and cam foot pressure arrangement has been incorporated in the new Model 1F Acromarker Name Plate Stamping Machine made by The Acromark Co. This replaces the screw pressure and simple lever principles used in former machines and is claimed to increase the foot power six to eight times.

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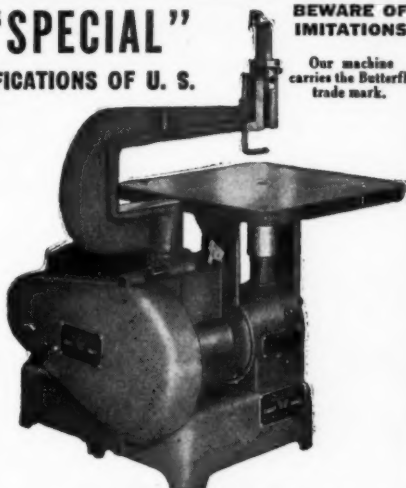
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This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D—10" Table; Model E.L.—12" Table. Model No. 14—14" table and heavy pedestals for all our machines.

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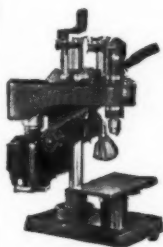
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# WHAT'S NEW IN METALWORKING

## MACHINES FOR VALVE HOLES IN V-TYPE MOTORS

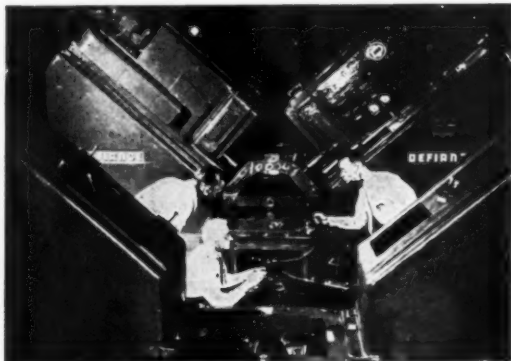
A series of 8 machines, designed and built by Defiance Machine Works, Inc., Defiance, Ohio., handles production machining of valve holes and inserts in the manufacture of V-type motors.

These machines, which are No. 37 hydraulic units, are mounted in pairs on columns with the proper angle for machining the valve holes. The series of machines use tunnel-type fixture. The locating pins and clamping arrangements are hydraulically operated and automatically arranged so that the locating pins locate the cylinder block before the clamping action takes place.

The hydraulic units carrying the cluster heads that drive the tools are also electrically interlocked so that the operator cannot start the cycle of the machine unless the hydraulic unit for the fixture is running.

The cycle of the machine is as follows: The operator places cylinder block in fixture and with small lever on front of machine the cylinder block is hydraulically located and clamped. The operator now presses cycle button and unit start button which will cause units to fast travel to the work, feed the required amount (some machines are equipped with an electrical time delay for facing) then rapid traverse reverse and stop. Cylinder block is now unclamped and shoved on back to the next machine. The operator is now ready to load another block and repeat the above operations.

The various operations and number of



spindles in each machine are as follows: Machine No. 1, 8 spindles—machines valve chambers and rough cuts the counterbore for inserts; Machine No. 2, 16 spindles—rough bores tappet holes and valve guide hole; Machine No. 3, 16 spindles—semi-finishes valve guide and tappet holes; Machine No. 4, 16 spindles—machines valve clearance and semi-finishes insert counterbore diameter; machine No. 5, 16 spindles—fly cuts valve guide and tappet holes; Machine No. 6, 16 spindles—line reams insert counterbore, valve guide, and tappet holes; Machine No. 7, 16 spindles—rough cuts valve seats of inserts; and Machine No. 8, 16 spindles—finish cuts valve seats of inserts.

### COPPER TUNGSTEN ALLOYS

A new line of copper tungsten alloys, available in the form of rods, bars and inserts, is now offered by Ampco Metal, Inc., Milwaukee 4, Wisconsin.

These are produced to enlarge its line

# SHELDON

precision



**SHELDON S-56**  
11 $\frac{1}{4}$ " swing  
1" collet  
capacity  
56" bed

SHELDON precision is of the new type; is the precision of modern manufacturing methods—a specially designed machine tool plant, tooled to the nth degree with the finest machine-tool building equipment. From this plant come precision lathes, milling machines and shapers—quality machine tools built to the closest tolerances on a quantity production basis much like a fine aircraft engine. Possibly equally accurate tools can be built "by hand" but only at far greater cost.

That is why SHELDON can always give "more tools for the money"—more accuracy, more capacity, more features and inherent quality. That is why it is always smart to "See the Sheldon at your distributors before you buy".

WRITE FOR CATALOG

See Our Exhibits at  
"Metal Show" Atlantic City, Nov. 18 to 22  
"Power Show" New York Dec. 2 to 7

## SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes • Arbor Presses • Vises  
Sheldon-Vernon Horizontal Milling Machines • Vertical Milling Machines and Jig Bore • Shapers  
4242 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U.S.A.

of Ampcoley resistance welding electrodes and to provide a suitable alloy for special conditions where the electrodes are held over a fairly long period at high heat and pressures or where water cooling is not always available or adequate.

The main applications of these alloys are for projection and flash welding, die facing and inserts, electrical upsetting and forging dies and similar applications.

Standard resistance welding electrodes may be secured with copper tungsten facing or on special spot welding tips, or flash and projection welding dies with copper tungsten inserts.

In addition to the above two silver tungsten alloys are being produced by Ampco in the form of rods, bars and inserts. These are suitable for applications such as circuit breaker contact material and arcing tips, and for circuit breaker facing material and special welding applications.

Additional information may be obtained from Ampco field engineers or by writing directly to the main office, Dept. BB, at Milwaukee.

#### **TAP SHARPENER**

A new spiral point, or "gun", tap sharpener, called the Blake Flute Grinder, is announced by the Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Mass. The new machine is said to provide the positive, mechanical controls necessary for the accurate, speedy and easy sharpening of both the spiral points and the straight flutes—not only of taps but also of other straight- and angular-fluted tools, such as countersinks, drills, etc.

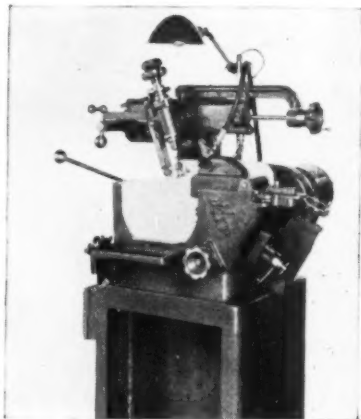
The machine is completely self-contained, the grinder proper—that is the working part of the machine—being mounted on a steel fabricated base which houses, in a rear compartment, an easily removable coolant system unit.

The method of holding the tap is unique. The shank is held in a special radius-grip draw-in collet which grips with merely sufficient force to keep the tap from slipping in the collet. The end of the tap is supported by means of back-rest bushings. This arrangement provides positive and vibrationless holding of the tap—a requisite of spiral point grinding.

Both rapid—and micrometer feed cross-wise movement of the workhead is provided. The spindle, carrying the grinding wheel, is adjusted on a cross slide by

means of a cross-feed screw having a micrometer-reading dial.

The manufacturer states that the diamond truing device is always central with the grinding wheel. It enables control of the thickness of the wheel as well as dressing of the radius. Movement of the diamond is controlled from the outside of the machine, permitting dressing of the wheel at any time, even in the middle of a grinding operation, if required.



Complete details of the Blake Flute Grinder are contained in the Company's Bulletin 466, available from Dept. BB.

#### **ROLLER CLUTCH PRECISION MANDRELS**

Due to expanded production facilities for manufacture of precision mandrels, Young Roller Clutch Precision Mandrels are now available for bore diameters .500 and up. Self-locking, self-expanding, self-contracting and instant releasing, the new Young Precision Mandrel, made by the Young Arbor Company, 3257 Bradford Rd., Cleveland Heights 13, Ohio, introduces a major development in mandrel design by incorporating the time-tested overrunning clutch which eliminates the use of "C" washers, wrenches and draw bars, and maintains concentricity in the low 10,000ths for the entire length of the work.

Operation cycle is speeded and extra-

ordinary precision maintenance is claimed. Work is merely slipped on the mandrel and is locked in place automatically and is ready for cutting tool, grinding wheel, deburring or polishing operations. Cutting pressure merely results in a tighter hold on the work.

No auxiliary power is required to expand a Young Precision Mandrel. It is



claimed that it cannot be sprung or damaged under normal use. A sleeve protects the work from damage, nicks or mars, and eliminates any possible tendency to "cloverleaf". Built to desired bore high limit with provision for automatic contraction to low limit—interchangeable sleeves.

For quotation, roughly sketch desired mandrel into your part print and forward to the Young Arbor Company, Dept. BB. An illustrated folder giving complete details is available.

### BRITEHONING

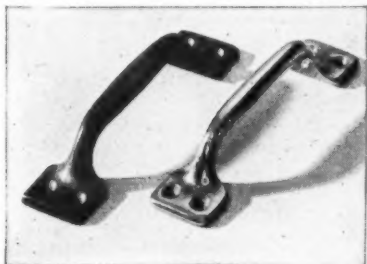
Britehoning is a new mechanical finishing process for small parts announced by The Sturgis Products Co. It is offered to the finishing industry as an improved mechanical method of processing small stampings, forgings, machined parts, extrusions, diecastings and sand castings.

The process is basically a tumbling method involving the use of mineral chips and suitable compounds for developing a fine semi-lustrous finish on practically all types of metal parts. It is ideally suited as a preplating operation for finishing small zinc based diecastings or brass stampings prior to bright nickel and chrome plating. Steel and aluminum parts can be finished by the same procedure with equally satisfactory results.

Parts to be finished can be processed directly after the forming or trimming operation, providing the die marks or stretcher marks do not penetrate too deeply into the surface of the part. Diecastings, if closely trimmed, may be processed as received from the trim die, but if the trimming is not close, a polishing wheel or abrasive belt operation may be

necessary to remove this prior to Britehoning.

The Sturgis Products Co. operates a sample processing department for determining the possibilities of using the Britehoning or other Roto-Finish processes. This service is free and available to any prospective users. Competent servicemen are available to establish and service the processes in customer's plants.



For complete information on Britehoning or the other Roto-Finish processes, write The Sturgis Products Co., Dept. BB, Sturgis, Mich.

### DISPLAY AT SOCIETY MEETING

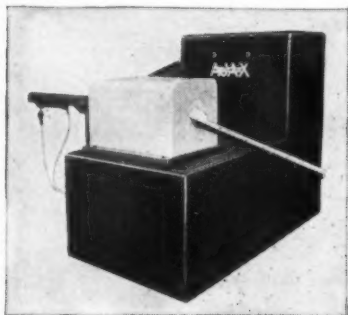
The Sentry Company of Foxboro, Mass., manufacturers of Industrial Electric Furnaces, will again exhibit at the National Metal Congress and Exposition to be held in the Municipal Auditorium at Atlantic City, N. J., the week of Nov. 13 to 22.

The display will include a Size No. 2, Model Y High Speed Steel Hardening Furnace in operation demonstrating the simplicity, economy and effectiveness of the Sentry Diamond Block Method of Atmospheric Control. Sample pieces will be hardened for examination at their booth, H-141, in the Auditorium. Those especially interested are invited to bring samples of any type of high speed steel pieces for hardening at the show.

In addition, a Size No. 2, Model V high temperature Combustion Tube Furnace will also be on display. Complete literature on other Sentry equipment will be available and the booth will be staffed at all times with engineers competent to assist in heat treating and equipment problems.

## INDUCTION HEATER

Designed for continuous, automatic heating of steel slugs or forging blanks prior to forging operations, this new Ajax-Northrup induction heater ejects a white-hot slug at just the right temperature, every few seconds. Just announced by Ajax Electrothermic Corp., Trenton 5, N. J., the unit features an automatic-timed pneumatic feeding device.



The cold slugs are loaded into a roller type chute on the left side of the heater; are fed in a continuous succession thru the horizontal heating coil by a pneumatic ram, and drop out at the other end of the coil into a chute or tongs, ready to be placed in the forging dies.

Production rate with slugs 3 $\frac{3}{4}$ " dia. x 13 $\frac{1}{4}$ " long, for instance, is claimed to be 350 per hour, each slug uniformly heated to about 2200°F. Power source is a 200kw. motor-generator set, operating at about 1000 cycles per second.

The new Ajax-Northrup heater can easily be converted from one job to another simply by changing the heating coil proper, resetting the timing device and adjusting the feeding chute. Since the heating coil itself is only a relatively small part of the total cost, a number of different sizes can be supplied economically. For instance, three interchangeable coils were supplied with the unit illustrated, for maximum heating efficiency on 1 $\frac{3}{4}$ " square stock, 2 $\frac{1}{2}$ " square stock, and 3 $\frac{3}{4}$ " dia. rounds respectively.

The attractive, easy to service housing of the continuous heater contains all capacitors and controls in one compact unit. Once the heater is set up for a particular job, it operates continuously with no further adjustments required. Address Dept. BB for further information.

## METAL SOCIETY TO MEET

Preliminary plans for resumption of the Western Metal Congress and Exposition have been completed and the event will be held in the San Francisco-Oakland Golden Gate area for six days beginning March 22, 1947. The last such event was held in Los Angeles in 1941.

W. H. Eisenman, managing director of the Congress and Exposition, stated that the two Oakland Civic Auditoriums will be the scene of the fifth such gathering after the lapse occasioned by the war.

The Western Metal Congress and Exposition will again be sponsored by the American Society for Metals and will have the active cooperation of West Coast chapters of the nation's leading technical societies.

In his announcement, Mr. Eisenman stated that "the West Coast has grown industrially in leaps and bounds. Its magnificent contribution to the winning of the war has demonstrated its ability to contribute in an even greater way to the productivity of the nation. Therefore, the American Society for Metals is happy to again sponsor this event."

Technical programs of the Western Metal Congress will include lecture courses, technical papers and round table conferences of special interest to the metals, aviation, petroleum, chemical, mining and general manufacturing industries.

In the Exposition will be shown a complete cycle of equipment and methods relating to the metals industries, including raw materials, heat treating apparatus and supplies, inspection methods and equipment, machinery, foundry supplies, materials handling, welding and cutting, oil field equipment, small tools and finished products.

Technical sessions of the Congress and exhibits in the Exposition will be housed in the two large civic auditoriums at Oakland. The two buildings are only 125 feet apart and are well suited to the handling of both activities.

Attendance at the 1941 Western Metal Congress and Exposition was approximately 50,000 and it is expected that the 1947 figures will exceed that total.

The offices of the American Society For Metals are at 7301 Euclid Ave., Cleveland 3, Ohio.

## A NEW TYPE ABRASIVE IS ANNOUNCED

A new aluminum oxide product known as 32 Alundum abrasive is announced by the Norton Company. It is claimed to be made by a unique electric furnace process which produces grains of an improved shape and structure, each grain being a complete, single crystal. Tests conducted in hundreds of plants are said to have shown that grinding wheels made of the new abrasive have a definitely faster and cooler cutting action, have longer life and require fewer dressings.

The grains of this new Alundum abrasive form in the electric furnace as single, individual crystals which do not require any crushing to size. Inasmuch as the crystals form individually they assume a chunky, nubby shape. The many plane surfaces form both exterior and reentrant dihedral angles, the latter making definite rake angles which increase the cutting efficiency of the grains.

The new and special electric furnace process by which this abrasive is made



was invented by and is patented by Norton Company.

The high performance of grinding wheels made of 32 Alundum abrasive is said by the manufacturers to be due to the sharpness of the nubby surfaced grains, to their blocky shape and to their high purity. The sharpness of the new abrasive gives wheels that cut very fast and very cool.

For explanation of process and more detailed information on this and many other of their products write to Dept. BB of the Norton Co., Worcester 6, Mass.

### PRESS TYPE SPOT AND PROJECTION WELDERS

Carrying out the same styling which has featured their rocker arm spot welder, Precision Welder and Machine Co. of Cincinnati, Ohio, announces the new Type AVA Vertical Action Spot and Projection Welders. These press type welders are made in four standard sizes covering the range from 30 KVA to 500 KVA and pressure to a maximum of 18000 pounds.

Among the features announced by the company are:

1—Machine is constructed and styled in the machine tool manner including unit assemblies, simplified installation and complete accessibility of the interior.

2—Honed brass air cylinders with cushion and universal connection to ram.

3—Fabricated steel frame, sides plain and unobstructed, with overhang arm integral for accuracy and rigidity.

4—Extra long ram with "V" ways fully contained in gibs and shrouded at top from dirt.

5—Gibs adjustable for wear providing full length lubrication and fitted with machine tool technique.

6—Visible and readily accessible and adjustable coolant flow, air gauge, pressure regulator and selector switch.

7—Vertical screw support also used for knee adjustment by fulcruming at rear.

8—Solenoid valve removable from air terminal unit assembly without disconnecting piping.

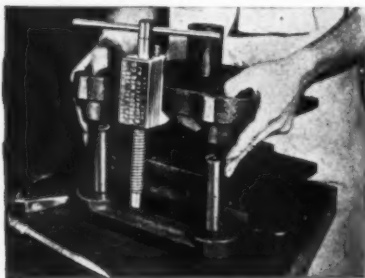
9—Power terminals unit assembly with all necessary control wiring harness, fuses and terminal strip completed at Precision plant. User's power connects easily.

An illustrated bulletin is available from Dept. BB of the manufacturers.



## THE FAST EASY WAY

Persson Safety Die Jacks, say its manufacturers, are entirely new tools designed by engineers and shop men to do



one job well—to separate die sets easier, faster and better than by ordinary hazardous methods. Lifting by hand or prying with bars not only take more time and labor, but also are dangerous—causing injury to operators and often damaging dies and punches.

The new Safety Die Jack, applied to the punch holder in a matter of seconds, enables a single operator to elevate the punch holder surely and positively to any height required and to lower it in the same effortless manner.

Die Jacks work as follows:

- 1—Clamp jack to holder.
- 2—Turn screw to raise or lower. The hollow ground end of the screwpost seats itself into the bed plate.
- 3—Lift off die holder.
- 4—The Persson Jack is particularly valuable when lowering punch sets. Positive adjustment of the jack screw permits the punch set to be stopped at any desired height.

The Die Jack is a compact tool—fits easily into a tool box. Product of Persson Mfg. Co., Dept. BB, 2 Henry St., Bloomfield, N. J.

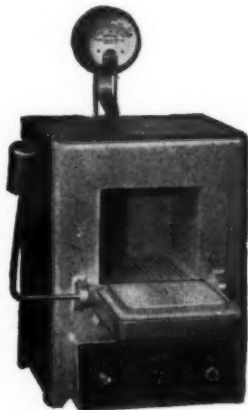
## MODEL CEA ELECTRIC FURNACE

A new electric furnace, which it is said offers a performance unusual for a furnace of its size and moderate cost, has been announced by the Thermo Electric Mfg. Co., 486 W. Locust St., Dubuque, Iowa. It is the outgrowth of a furnace originally designed to meet certain spe-

cialized requirements, and which led to several important developments. Known as the Model CEA, this new furnace will offer wider utility for general laboratory use and for production heat-treating of small parts.

The heating chamber measures  $4\frac{1}{4}$ " wide,  $4\frac{1}{4}$ " high and 6" deep, with overall dimensions of 12" wide,  $15\frac{1}{2}$ " high and  $14\frac{1}{2}$ " deep. The fact that the furnace will maintain a temperature of 2000°F. continuously and automatically hold any selected temperature from 500°F. to 2000°F. should considerably increase the scope of this type furnace. The manufacturer also emphasizes the fast heating of this Model CEA—up to 1500°F. in 30 minutes.

Mounted on the control panel is the Temco variable heat control which provides any desired temperature by the turn of a knob, and holds it automatically. An indicating pyrometer shows muffle temperature, and is calibrated in both



Fahrenheit and Centigrade scales. The control panel also contains an "on-off" toggle switch.

Additional refinements are the neon light on the control panel which glows to indicate when current is on, and the ledge on the inside of the door which helps to seal the oven opening and minimize heat losses. The Model CEA is available for use on either a-c or d-c current, either 115 or 230 volts.





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# Increases Production With Dual Automatic Welding Set-Up

Heat dissipating structures are now welded four to five times faster than by previous automatic welding, by Combustion Engineering Co., Coshocton Iron Division, Monongahela, Pa.

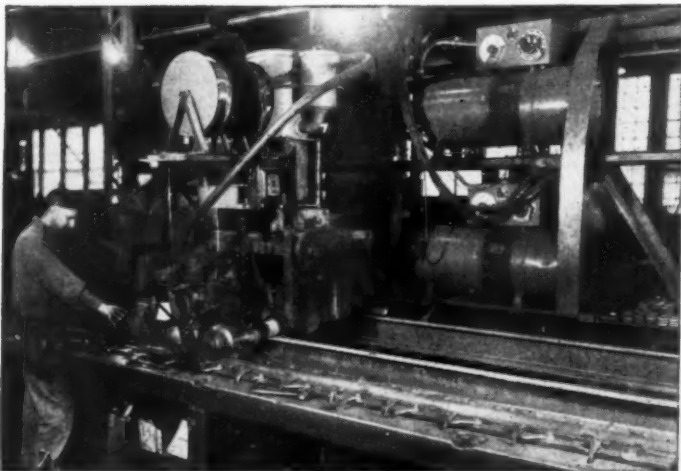


Fig. 2—Automatic welding process in operation with fixture arrangement for clamping the work in the foreground.

**A**N INTERESTING installation of automatic welding which has materially boosted production, as compared to the previous automatic welding set-up, has been credited to the developments in the new process.

The items produced are heat dissipating structures composed of 2 pieces of flat steel plate which are welded simultaneously to opposite sides of lengths of tubing. The process has proven much

simpler, faster and more economical in operation than the method of welding previously used.

One of the interesting aspects of this installation is the arrangement whereby two complete welding heads are mounted in parallel on a single travel carriage. This set-up is shown in Fig. 1 which illustrates the entire carriage with dual welding heads, flux hoppers and wire reels, mounted along with a single flux

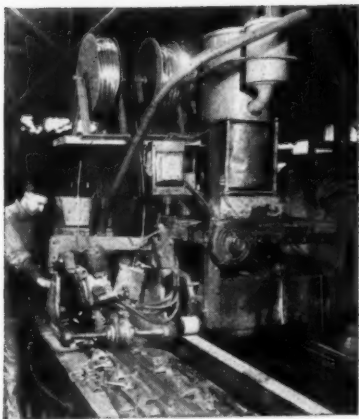


Fig. 1—Dual welding unit mounted on traveling carriage for automatically welding both sides of heat dissipating structure at one time. recovery unit and electric motor for driving power. The carriage is equip-

ped with needle bearing rollers to facilitate ease in traveling along U-beam tracks located parallel to the work.

The three pieces which make up a complete heat dissipating member consist of 16-foot, 8-inch and 28-foot, 4-inch, lengths of 4-inch diameter A. S. T.M. 8340 and 8342 tubing with 2 strips of  $\frac{1}{4}$ -inch by 1-inch or  $\frac{1}{4}$ -inch by 1-7/16-inch soft hammerweld steel fins.

Preparation for the automatic welding procedure requires the positioning of the tube horizontally along the welding fixture (refer to Fig. 2). The two welding generator units shown in background in this view permit a current range up to 1200 amperes.

The two metal fins are positioned flat, parallel with the tube, and held by means of air-operated clamps so that the inner edge of each fin butts against the wall of the tube. For some of the larger sized jobs of this kind, the fins are first tack welded to the tube.

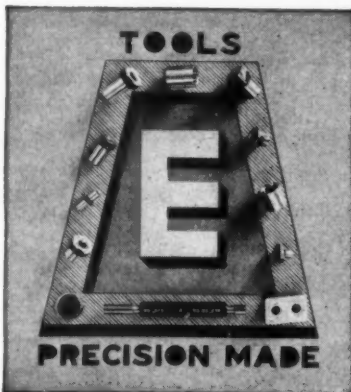
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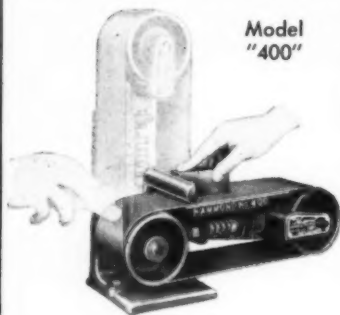
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- ✓ Life-time machine tool construction.
- ✓ Horizontal or vertical — only a minute to change.
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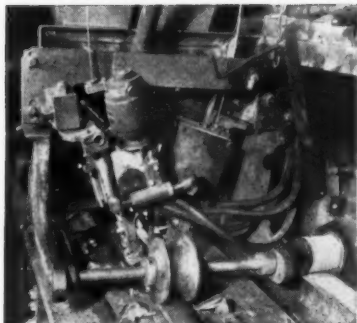
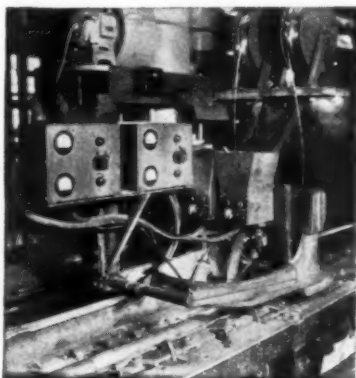


Fig. 3—Close-up of the dual head set-up for applying two fillet welds simultaneously.

The dual welding carriage is then started at one end of the assembly, the two welding heads being slightly tilted as shown in Fig. 3. This tilt permits the electrode to be fed in at an angle which gives the maximum effective throat for this type horizontal fillet weld. Note grooved roller guide in this view which rides along tube in front of welding arcs as they weld both fins at one time.

Fig. 4 shows the rear view of the

Fig. 4—View of dual "Lincolnweld" unit from operator's end showing control boxes, left, center.



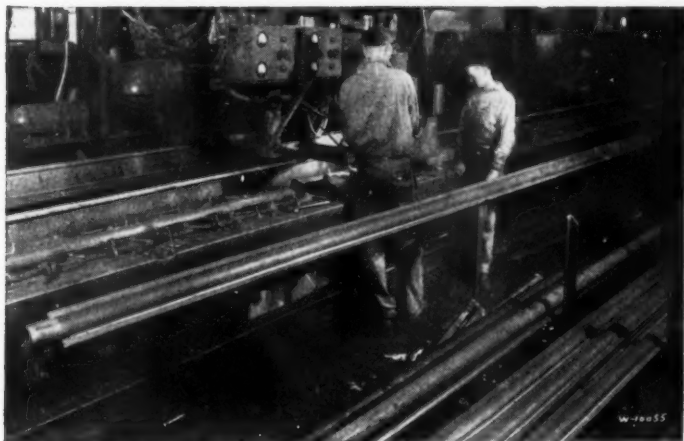


Fig. 5—General view of welding operations showing relative length of fixture and finish welded assemblies at center and right, foreground.

carriage set-up with the automatic controls shown at left, center, offering maximum accessibility to the operator.

Speeds as high as 72-inches of weld per minute have been obtained on this job. Bare metallic electrode of 5/32-diameter is used and weld penetration of the joint is about 60 percent.

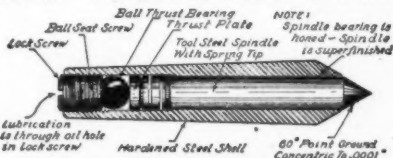
The length of the welding fixture is indicated in the general view (Fig. 5) which also shows a completely welded heat dissipating tube at center, foreground, with portions of three other finished tubes in the rack at lower, right.

In some instances, several tubes are placed end to end in the fixture and continuously welded at the same time.

The particular advantages of this process include such factors as one grade and type of flux, together with one analysis of electrode, can be used with the same procedure for a wide range of steel analyses. Thus, special joint preparations, changing of flux, wire analysis and welding procedure are eliminated. This is of tremendous importance to those using automatic welding. Furthermore, the equipment will

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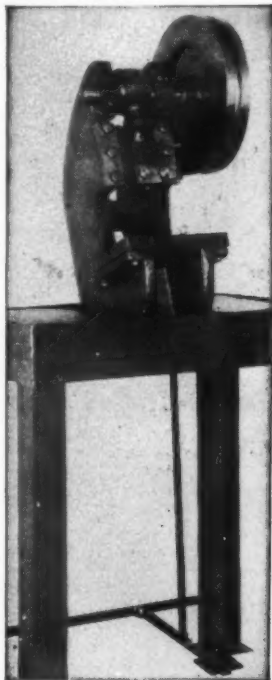
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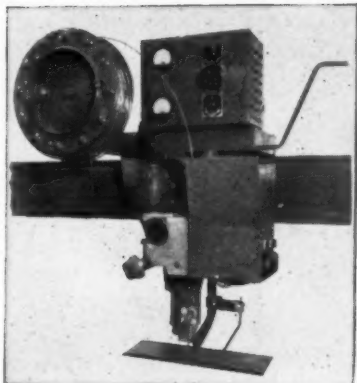
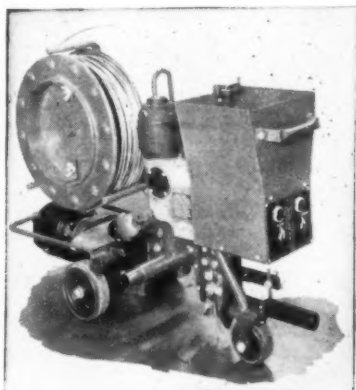


Fig. 6—New carriage type "Lincolnweld" mounted on beam.

take  $\frac{1}{8}$ -inch to  $\frac{7}{32}$ -inch electrode without changing drive rolls, wire contact or control, the latter being extremely simple, giving the operator quick and easy control over voltage, current and speed when changing from one job to another.

Fig 6 shows the welding head, with flux hopper, wire reel and control

Fig. 7—"Lincolnweld" unit of the motor driven tractor type.



mounted on a motor driven carriage. Fig. 7 shows head mounted on the portable tractor unit. This has straight wire guide for butt welding. For square butt welding, a pointer is used for following irregular seams. For prepared joints, roller guides are provided for engaging the seam.

The standard head is changed from butt to fillet welding in a matter of only a few minutes. In making fillet welds the lower wire guide and flux tube are changed from straight to curved, thus permitting the head and wire reel to be left in its normal position. The wire is fed in at 40 degrees from horizontal which gives the maximum effective throat for horizontal fillet welds.

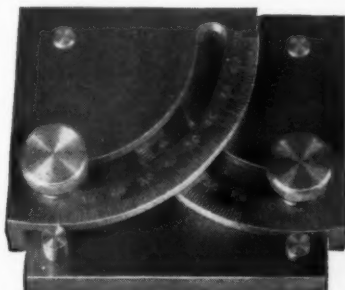
This process has been successfully used in welding butt, lap, tee, fillet and corner joints used in the fabrication of a variety of products, among which are machinery beds and bases, motor and generator frames, ventilating fans, tanks and pressure vessels of all kinds, and many parts used in the prefabrication of ships, railroad cars, etc.

This process meets the welding codes, rules, regulations and specifications sponsored by the following:—A.S.M.E. Power Boiler Code; A.P.I. — A.S.M.E. Unfired Pressure Vessel Code; Rules of American Bureau of Shipping; Lloyd's Register of Shipping Regulations; and the United States Maritime Commission.

Pictures and data on the "Lincolnweld" herein described is provided by the Lincoln Electric Co., through the courtesy of Combustion Engineering Co.

### UNIVERSAL ANGLE PROTRACTOR

The new universal angle protractor, just announced by Willey's Carbide Tool Co., can be used on all makes of carbide tool grinders and provides a dual change of angles from 0° to 90°. This unique Willey's feature greatly speeds up production by permitting the grinding of two tools simultaneously, at the same or different angles.



Willey's Universal Angle Protractor, while designed primarily for grinding applications, also lends itself to a variety of operations, such as acting as an angular guide for drilling, grooving and milling.

The key is a separate unit which is studded to the body of the adaptor and slides on four steel balls which provide constant thrust and mobility.

Full information may be had by writing Willey's Carbide Tool Co., 1342 W. Vernor Highway, Detroit 1, Mich.



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*Famous for*  
**THE TIME  
THEY SAVE!**



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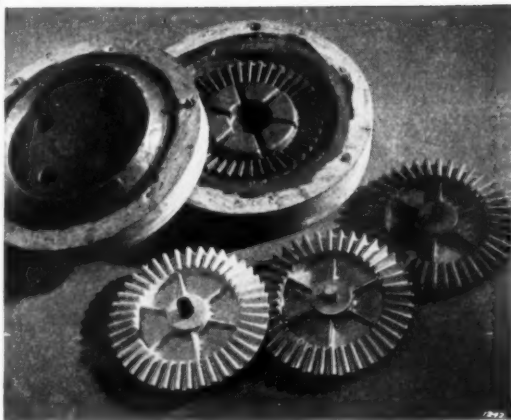
# Let's Talk Shop

## CASTING OF VARIOUS PATTERNS

The photograph shows a wood pattern, a cast aluminum pattern, a Durez phenolic casting resin pattern, and the plaster mold in which the Durez pattern was cast. Data furnished by the pattern maker, J. F. Carpenter, Houston, Texas, are exemplary of the many reports of more economical production of foundry and duplicating machine patterns thru the use of this casting resin.

Time and material for the aluminum pattern in this particular case were reported to be: 16 hours cleaning; 3 lbs. cast aluminum; 3 sheets emery cloth. Time and material for the cast resin pattern were  $4\frac{1}{2}$  hours making and painting plaster mold and mixing resin; 5 lbs. plaster;  $1\frac{3}{4}$  lbs. Durez resin;  $\frac{1}{4}$  sheet garnet sandpaper; and a few spoonfuls of paint.

Additional cast resin patterns required only  $1\frac{1}{2}$  hours time and  $1\frac{1}{4}$  lbs. of Durez



resin for each pattern.

Pattern Maker—J. F. Carpenter, Box 7403, Houston Hts. Sta. Houston 8, Texas.

Casting Resin—Durez Plastics & Chemicals, Inc., North Tonawanda, New York. Please address all inquiries to Dept. BB.

## FOUNDRYMEN TO MEET

American Foundrymen's Association, world-wide technical society of the castings industry, will hold its 51st annual convention in Detroit April 28-May 1, with the Book-Cadillac and Statler hotels as joint headquarters, Sheldon V. Wood of Minneapolis, president, has announced.

Among those attending will be foundry executives, metallurgists, chemists, engineers, ceramic experts, personnel and operating men, and representatives of the many industries which supply foundry equipment and materials.

## SAFETY DIRECTORY

The Alfred M. Best Company announces, thru their Safety Engineering Division that the first annual edition of Best's Safety Directory is now off the presses and ready for distribution.

In one volume, Best's Safety Directory presents an "encyclopedia" covering essential information on over 1,000 products, devices and equipment used in safety, first-aid, hygiene, health conservation and fire protection.

By telling in a nutshell "what safety product to use", "when to use it", "how to use it", and, "where to get it" Best's



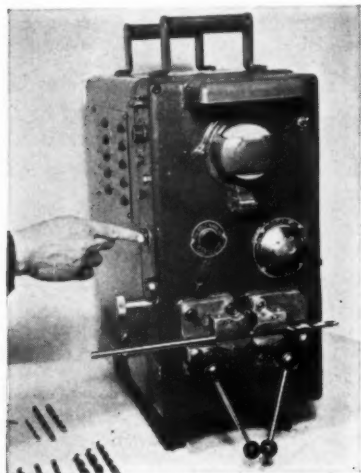
Safety Directory helps to prevent accidents, decrease production costs and eliminate time and energy normally wasted when 'hunting around' for safety information.

It is cross-indexed and contains a comprehensive, topical index which makes for easy use.

This Safety Directory is priced at \$5.00 and can be obtained from the home office of the Alfred M. Best Company in New York City or at any of their branch offices located in Atlanta, Boston, Chicago, Cincinnati, Dallas or Los Angeles.

### FLASH BUTT WELDER

Providing a quick economical method of joining most metals so joints are strong and flexible, this new portable welder designed for production welding of bar and round stock up to 5/16" dia. is find-



ing a multitude of uses such as repairing small tools, butt welding tool bit extensions and shanks and joining band saw blades from 1/16"-1 1/4" in width. Features of time saving convenience include: Built-in grinder for weld dressing, automatic motor controlled feed of material making it easy for inexperienced operators to secure good welds, and cam operated

lever method of clamping which speeds up the welding operation tremendously.

Welding is fully automatic, the complete cycle being controlled by a single pushbutton switch. In addition to welding, annealing and flash dressing, an etching attachment provides a means of permanently identifying workmen's tools, templates, attachments, jigs, fixtures, dies, etc.

Designed for standard a-c 220 volts single phase 50/60 cycle operation, this model DBW-3A, either pedestal type or in a metal carrying case, can be supplied for other voltage requirements. Manufactured by the DoALL Company 1301 Washington Ave. South, Minneapolis 4, Minnesota. Please send requests to Dept. BB.

### FLUORINE MANUAL

To supply available information on properties and precautions for handling fluorine to purchasers of this rare and highly reactive element, the Pennsylvania Salt Manufacturing Company has prepared a preliminary manual, designated Pennsalt Manual F-1.

Because general commercial shipments of fluorine are such a recent development, Pennsalt desired to pass on to potential users all present information to bring their data up to date before beginning research with the gas. In June Pennsalt announced it was offering fluorine generally for research purposes for the first time.

Pennsalt officials said since this is a preliminary manual to meet an immediate need, it will not be given the broad circulation now given to other basic Pennsalt manuals, such as the ones on Caustic Soda and Chlorine. In addition to going to research laboratories selected for first deliveries, the manual will be distributed to a small list of industrial firms and universities and a few technical libraries.

Pennsalt Manual F-1 gives instructions for handling half pound cylinders of fluorine, including known data on first aid; the chemical and physical properties of the element, an outline of literature on organic fluorine compounds and an introduction to the chemical literature of inorganic fluorine compounds.

Since the toxicological properties of fluorine have not been fully investigated and present knowledge indicates that its action on the human body is similar to but more intense than anhydrous hydrofluoric acid, the recommended first aid treatment for the acid is given. Refer to Dept. BB when making inquiries.

## CENTER DRILLS THAT STAND THE TEST

Center Drills which will not perish is the claim of the Howard H. Heinz Co., 318 Boulevard Building, Detroit 2, Mich. This company claims to stop center drill breakage and work spoilage with the use of their new "Hy-Co".

Here are some of the statements of the company:

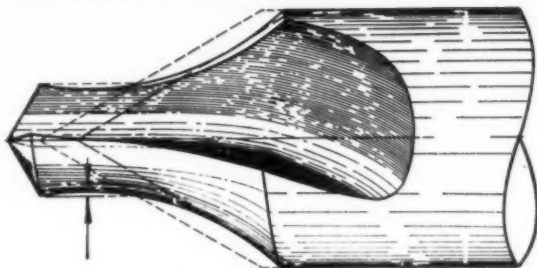
1—De-Burring is eliminated due to a better machining job.

2—Center grinding is eliminated. Lapping with rotating felt wick removes heat-treat scale and restores perfect center.

3—Lathe center damage is eliminated by the larger oil reservoir.

4—Resharpening is possible, there is no fatigue point, and high efficiency.

5—When a work-piece drilled with a "Hy-Co" center drill is placed between the centers of a machine, only a narrow band-like section (line-contact) of the



spherical surface is engaged. As the tail-stock center is closed until finally loaded, a highly burnished, and thereby densified, section of the seat is produced. This rollerized area is, due to its highly-finished surface, of a tremendous load-carrying capacity. The coining action—closing of the tail-stock center—ends when the strength of the metal and the load applied are in equilibrium. The seat so produced will establish a true never-changing center of rotation in the work-piece. Further information may be obtained from the manufacturers by writing Dept. BB.

## SCREW MACHINE MOVIE

Greenlee Bros. & Co. has a 40 minute, 16 mm sound movie now available showing the construction and operating features of the Greenlee 6-spindle Automatic Screw Machine.

In many respects the film serves as a practical training aid for Greenlee operators and set-up men and for a prospective user gives detailed information about the machine's construction.

It features the building of a Greenlee Automatic from foundry to finished product. The design and function of

hidden parts and mechanisms are exposed, and specific attention is given to principles of operation and set-up. The presentation includes several views of machines in actual operation in various plants, with closeups showing tooling and parts produced.

The film is usable on any standard 16 mm sound projector and may be obtained for showings to interested groups on a loan basis by writing Greenlee Bros. & Co., 1838 Mason Ave., Rockford, Ill. Requests should state the length of time it will be necessary to retain the film.

## BROACHES

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## 16" SERIES VERTICAL HYDRO-TEL

Extremely versatile as a general purpose milling machine, the 16" Series Vertical Hydro-Tel, built by The Cincinnati Milling Machine Co., can be provided with automatic control mechanisms which make it an unusually efficient automatic die-sinking and profiling machine.

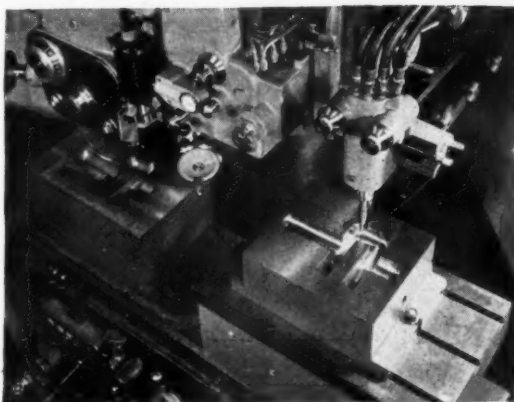
The basic machine consists of a fixed height bed cast integral with the rear base. The table is carried in wide-spaced, square gibbed ways on top of the bed, and a heavily proportioned cross-slide unit is similarly mounted on top of the rear base. It is built in three distinct styles:

**1—General Purpose Milling Machine.** This is the basic machine and is provided with hand and power feeds to the table and cross-slide; hand feed only for vertical positioning of the spindle carrier. This machine is for general purpose work, or for hand controlled die-sinking operations.

**2—Die-Sinking Machine With Automatic Depth Control.** This is the basic machine plus an automatic hydraulic tracer mechanism which provides sensitive, automatic duplication of templates or master shapes. This machine may be used for either general purpose work, or for automatic, tracer controlled die-sinking.

**3—Automatic 360° Profiling Machine.** This variation is equipped with an automatic, hydraulic 360° profiling mechanism and is supplied for tracer controlled profiling work.

Hand and power feed movements of the sliding elements are hydraulically actuated to provide effortless operation and smooth, cushioned cutting action. Power feed rates are non-related; they are independently controlled and selected and may, if necessary, be used simultaneously at differing rates. Feed rates for both tables and cross-slide range from 1" to 25" per minute. A special feed range of  $\frac{1}{2}$ " to  $12\frac{1}{2}$ " per minute, useful for die-sinking applications, is available at extra cost.



Power feeds for table and cross-slide are each controlled by a single directional control lever having five operating positions to control both feed and rapid traverse in both directions. All hand-wheels are equipped with micrometer dials for accurate positioning of the slides and a built-in scale and pointer is supplied for both the table and the vertical spindle carrier to simplify the rough positioning of these slides.

Sixteen spindle speeds are supplied, the standard range being 25 to 1500 rpm with an optional range of 33 to 2000 rpm. A High Speed Spindle Attachment is available and gives 2.5 times the spindle speed.

Smooth functioning of all hydraulic mechanisms is assured by efficient multiple filtration of the hydraulic oil. An indicator light on the push button control panel signals the need for cleaning when the stone filter becomes clogged. All important bearings are automatically lubricated with filtered oil and an indicator light on the push button control panel warns of low oil level in the lubricating oil reservoir.

All electrical functions of the machine are controlled from the single push button control panel at the front of the bed. Master start and stop buttons control all motors.

Power vertical feed to the spindle carrier is available at extra cost. The feed

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WALTON  
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Remove  
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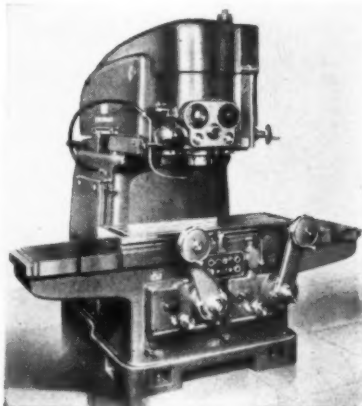
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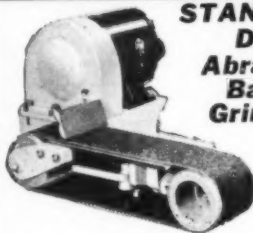
**THE WALTON COMPANY**  
94 ALLYN ST. HARTFORD, CONN.

rates, ranging from  $\frac{1}{4}$ " to  $3\frac{3}{4}$ " per minute, are ideally suited to boring operations.

When supplied for die-sinking work, the machine is equipped with the Hydraulic Automatic Depth Control, a sensitive hydraulic tracer mechanism which automatically synchronizes the vertical



**STANDARD  
D-4  
Abrasive  
Band  
Grinder**



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for  
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood.  $4 \times 36\frac{1}{4}$ " band. The ideal portable unit.

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**WALLS SALES CORP.**

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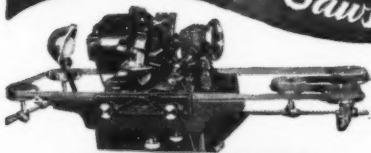
movements of the spindle carrier with either table or cross-slide feed movements to reproduce on the workpiece, the contour of the master shapes or templates. A supporting bracket is provided for use with master shapes.

The Automatic 360° Profiling Machine is provided with a completely automatic hydraulic tracer mechanism which actuates the movements of the table and cross-slide, under the control of a tracer finger, to accurately duplicate profile shapes in a horizontal plane. The tracer finger will follow the complete outline of an external or internal template, in either clockwise or counterclockwise direction.

Hand and power feeds of the table and cross-slide are not supplied on the Profiling Machine; all movements of these slides being controlled by the automatic profiling mechanism only. Consequently this machine is useful for profile milling only and is not suitable for general purpose work.

More complete information on these machines is contained in a 20-page fully illustrated catalog which may be obtained by writing for Publication No. M-1497, The Cincinnati Milling Machine Co., Dept. BB, Cincinnati 9, Ohio.

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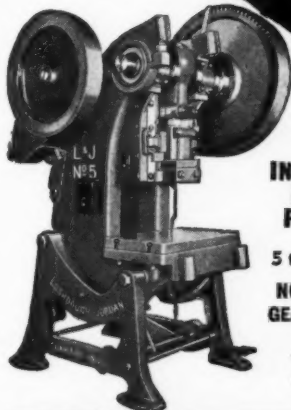


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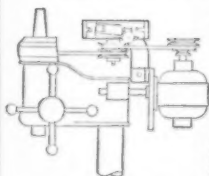
F.O.B.  
LOS ANGELES

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## ★ FEATURES ★

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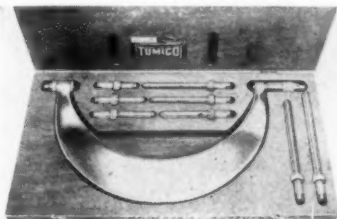
### SPEED TABLE

Reduction Ratio*	Mach. Min.	Speed Max.
1-1	1000	3240
1-1.5	666	2160
1-2	500	1620
1-2.5	400	1300
1-3	333	1080
1-3.5	286	920
1-4	250	810

\*Reduction ratio between motor pulley and driven pulley. Figures above based on 1800 RPM Motor Speed.

## INSIDE TUBULAR MICROMETERS

Measuring bores without removing boring bars is now possible with the new tubular over-the-bar inside micrometer manufactured by the Tubular Micrometer Co. This new precision measuring device



is used to determine bore sizes over or around center obstructions. Unlike micrometers which require removal of the boring bar and disturbing the cutter settings, the tubular micrometer does not entail this work. Instead, it is merely placed around the bar in correct measuring position and the micrometer reading is taken.

All size frames have a vacuum in the center to insure minimum expansion and contraction. Hand heat will not affect the micrometer reading for it is dissipated in the vacuum and does not distort or follow the metal frame.

The standard range of sizes of this new over-the-bar micrometer is from 8" to 28", and will cover bar diameters from 4" to 8". Each micrometer will fit over a variety of bar sizes. Thus, the 13½" set shown will cover any bar up to 7½" in diameter. Mandrels in ¼" steps will fit any bore diameters within the established range. Special tubular micrometers for larger size bores may also be obtained upon application. All sets are furnished complete with necessary mandrels and adjusting wrenches and are packed in protective well-finished hard wood cases.

To learn more about this write to Dept. BB, Tubular Micrometer Co., St. James, Minn.

## HEAT TREATING FURNACE

Modifications on their 3-Chamber Heat-Treating Furnace are announced by the Barking Fuel Engineering Co., Chicago 22, Ill.

The base of this pedestal-type furnace

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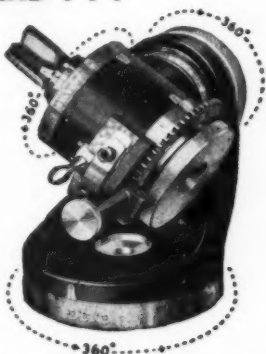
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Holds all Straight or Taper Shank Tools from 1/16" to and including 1 1/2" diam.

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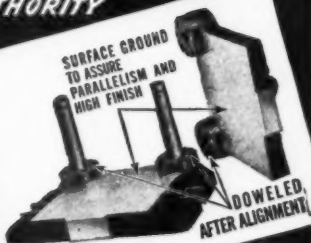
**GRINDERS & FIXTURES, Inc.**

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Cleveland 13, Ohio

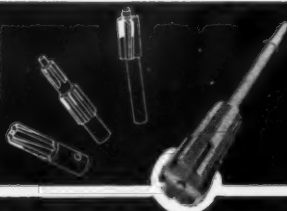
## BAUMBACH

THE DIE SET  
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All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

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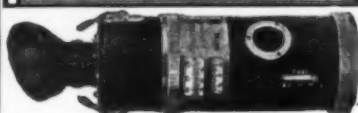
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## PYRO THE SIMPLIFIED OPTICAL PYROMETER



Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

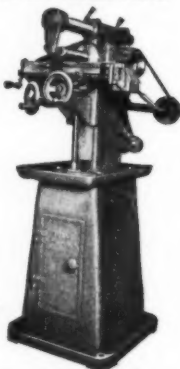
**THE PYROMETER INSTRUMENT CO.**  
102-105 Lafayette St., New York, N. Y.

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Make Fast Work of Small Jobs

Motor  
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## SALES MANAGER

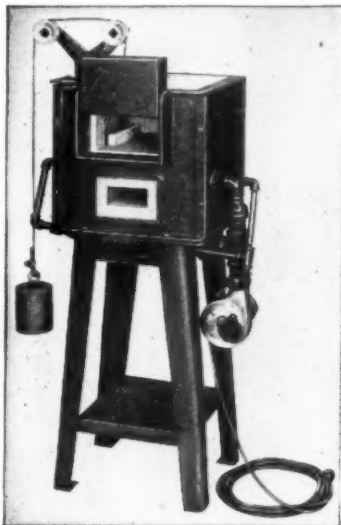
Experienced: Sales of Machine Tools, Metal Fabricating Equipment. Sales Promotion, organize territories, quotas, systems, reports, customer correspondence, engineering Sales letters. Assume direct charge of Salesmen.

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is now made of welded steel for lighter weight, better appearance without loss of strength. All piping has been raised and simplified for greater accessibility and to leave area under furnace clear. A shelf is provided for holding tools, or parts.



Lower fire box, the manufacturers say, now develops 2500° F. in 15 minutes. Center fire box develops 1800° F. in 14 minutes. Ability to attain and hold low heat of 600° F. in center chamber is claimed. Silent blower supplies air for furnace and for pot type furnace, if one is used in conjunction.

Complete specifications can be obtained by writing for Bulletin 347-R, Dept. BB.

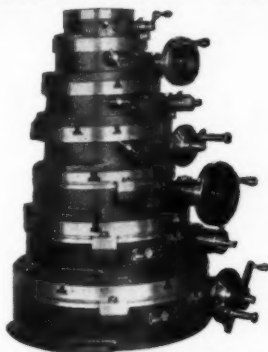
## NEW OFFICE

The Landis Tool Co., Waynesboro, Penna., announces the opening of a new Cleveland Office. The address is 3091 Mayfield Rd., Cleveland 18, Ohio.

P. E. Beaver who will be the manager, represented the company in England before World War II and has since been with the Chicago office.



## TROYKE ROTARY TABLES



Sizes 9", 12", 15", 18", 21" & 25".

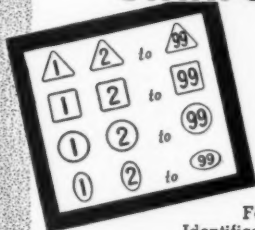
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## New STEEL INSPECTOR'S STAMPS



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Identification  
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Different borders may be used  
for different shifts. Available  
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## NIELSEN Heavy Duty *Live* Centers



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Precision type  
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bearings assure  
maximum capac-  
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## PEEKLESS... *Bench Surfacer* No. 601



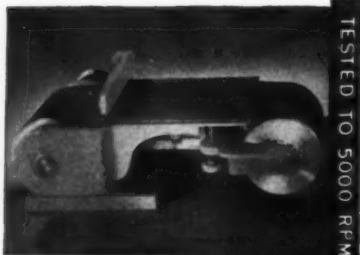
Compact belt surfacer ideal for small  
work and for the tool room. A handy  
speed finisher. Furnished complete with  
motor and cord already to plug into  
your lighting circuit.

Complete unit mounted on cast iron  
base if desired.

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GREENFIELD, MASS.**

# New BELT SANDER

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TESTED TO 5000 RPM

For  
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WOOD & GLASS



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FOR EITHER  
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- PERFECTLY BALANCED PULLEYS
- 5"x8½" WORK AREA, 36" BELT

A husky ball-bearing sander and tool grinder built for maximum efficiency, smooth operation and long life. Reversible platen usable on either face. Dealer inquiries invited.

**WOODS ENGINEERING CO.**

29 WALL ST. NORWALK, CONN.

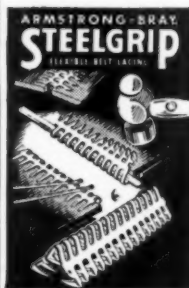
## BROACH CORPORATION FORMS IN THE BLUEGRASS

The Acme Broach Corporation has announced that they have started production of Broaching Machines and Tools.



This is a new Corporation, but they report that the manufacturing of this type of equipment is far from new to their personnel.

Many of the Executives, Department Heads, Foremen, and production and shop men have experience ranging up to 36 years. The Design Department will be headed by Mr. I. K. McAdam who was previously associated with the American Broach & Machine Co., at Ann Arbor, Mich. Mr. McAdam brings with him 12 years of experience in this specialized type of work.



### STEELGRIP BELT LACING

A strong lacing for all types of belts. Put on with a hammer in a few minutes. Clinches smoothly into belt, compresses ends, prevents fraying. 2-piece hinged rocker pins provided. 11 sizes. In boxes, handy packages, cartons and long lengths.

Write for  
catalog sheets.

**ARMSTRONG-BRAY & CO.**

"The Belt Lacing People"  
5364 Northwest Highway, Chicago 30, U.S.A.

### PROMPT SHIPMENT BELT LACING Both types from 1 source

BELT HOOKS come with blue aligning cards that prevent waste—every hook can be used. Protects fingers. Applied with a WIREGRIP or any other standard Belt Lacing Machine. 6 sizes.



The Heat Treat Department is said to be modern in every respect, with furnaces which boast the latest in controls to attain proper hardness. The firm occupies new buildings which were built specifically for this type of work.

Shown here are their Horizontal Type Broaching Machine and their Vertical Press.



Several bulletins have been issued which illustrate and describe their products. These may be had by writing to Acme Broach Corp., Dept. BB, E. Third St., at Delaware, Lexington, Kentucky.

#### SOLDER PRODUCT

A new color bulletin describing a unique solder product, Tri-Core, recently developed by Alpha Metals, Inc., has been issued by that company.

The folder describes Tri-Core as a self-fluxing solder, with three cores located just beneath the outer surface of the wire. This new 3-core design assures a continuity of flux flow, as empty flux sections are precluded.

Since Tri-Core permits use of lower tin content solders, the solder cost per pound to the user is less.

Copies of the bulletin, which give detailed information about Tri-Core, may be obtained from Alpha Metals, Inc., Dept. BB, 359 Hudson Ave., Brooklyn 1, New York.

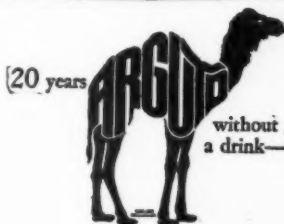
## ARGUTO OILLESS BEARINGS

# USED

# ALL OVER THE WORLD

## ... IN MANY DIFFERENT APPLICATIONS

## "OUTWEARS THE BEST BRONZE METAL"



## ARGUTO OILLESS BEARING CO.

WAYNE, MICHIGAN

PHILADELPHIA

#### 4-WAY AIR VALVES

Pneumatics Incorporated of Plymouth, Indiana offers a new line of  $\frac{1}{2}$ " 4-Way air valves available in hand lever, palm, foot, pin, single and double pilot operated, and single and double solenoid operated models for recommended maximum 150 psi service. All of these valves have  $\frac{1}{2}$ " unrestricted air passages. Action is fast, positive, and easy.

Their small compact design provides for convenient application in restricted areas. Some models are furnished as standard two position valves, others with spring return requiring the operator to

hold lever depressed during the working stroke of the cylinder.

The easily operated Palm valve has been designed with a large palm shaped lever to fit the hand and is unique in that this valve may also be installed vertically and activated by the knee or other parts of the body, leaving the hands free.

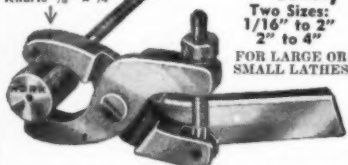
Pneumatics Incorporated also offers a new line of single and double acting cushioned and non-cushioned air cylinders designated as Series "E" for recommended maximum 300 psi service. The cylinders, likewise, have been designed for compactness for installation in the smallest possible areas and with improved sturdy construction for rugged service.

One of the unusual characteristics of the cylinder is the combination of cushioning feature in the standard non-cushioned cylinder at less additional cost.

Information may be obtained by writing to Dept. BB of Pneumatics, Inc.

#### KNURL it Easily, Quickly, Safely

Use any Standard Knurls  $\frac{1}{8}$ " x  $\frac{1}{4}$ "



Two Sizes:  
1/16" to 2"  
2" to 4"  
FOR LARGE OR SMALL LATHES

Joseph B. Fakes & Co., Royal Oak, Mich.

Here's a good shop worker with a low "over-all" rate



#### LOVEJOY L-R TYPE "A" FLEXIBLE COUPLINGS

Pat. and Pats.  
Pend.

For pumps, stokers, etc.  
—all small machines.  
1/6 to 40 hp.

Simple construction cuts assembling costs and ends servicing and adjusting problems. Easy alignment of shaft. Spiders or load cushion of rubber, leather, felt, etc., as installation indicates. Always in sight for inspection; easily and quickly replaced.

Send for LOVEJOY L-R Catalog and Selector Charts, and save hours. Shows coupling sizes, prices, etc., at a glance. Write today.

#### LOVEJOY FLEXIBLE COUPLING CO.

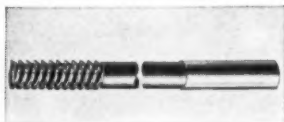
Also Mfrs. of the IDEAL Line of Mechanical Power Transmission Equipment

5026 W. Lake St.

Chicago 44, Illinois

#### SHEARCUTTER ROTARY BROACHES

The Fearless Tool Company, who have recently acquired the manufacturing rights of the Shearcutter Rotary Broach, announce the production of a new type of Shearcutter Rotary Broach.



This new invention introduces an entirely new technique in producing holes in metals. The technique is called "Rotary Broaching" because the tool is, in effect, a broach that rotates as it cuts! The tool is made with high spiral or helical cutting edges, and when end pressure is applied, these helical cutting edges remove metal in a true shearing manner. Rotary Broaches, which replace reamers and broaches, produce absolutely accurate holes with a finish that is claimed to be superior to that produced by ordinary tools or other machining methods.

Shearcutter Rotary Broaches are said to remove metal by molecular cleavage in a shearcutting, knife-like manner. The chips removed are unlike those produced by other tools for they resemble steel

**THERE IS NO  
COMPRESSED AIR  
CONDITION IN ANY  
FACTORY SO BAD THAT  
WE CANNOT CORRECT  
AND COMPLETELY  
REMEDY**

For thirty years we have made the above claim and have proved its truth in thousands of plants.

*Joe A. Murphy*

**JAS. A. MURPHY & CO.**  
HAMILTON, OHIO, U.S.A.

MASTERCODERS • SEPARATORS • STRAINERS • TRAPS  
SPRAY GUNS • PISTOL SPRAYERS

Guaranteed Compressed Air Products

Moisture Elimination Up To 3000 Pounds Per Square Inch

**New Britain  
UNIVERSAL VISE  
THE ORIGINAL**

Swivels 360 degrees horizontally,  
100 degrees vertically, to  
give any angle or com-  
pound of  
angles.



Write for  
Further  
Information.

**NEW BRITAIN TOOL & MFG. CO.**  
NEW BRITAIN, CONN., U. S. A.

**SAVE  
Labor  
and  
Time**



Eliminate heavy lifting. Cut handling costs. Table swivels and locks in any position. Can be varied 15 1/2° by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send **TODAY** for illustrated catalog No. 2.

**MIDWEST TOOL & ENG. CO.**  
112 Webster St., Dayton, Ohio

**Micro  
Supreme  
LAY-OUT AND  
IDENTIFICATION DYE**



**12 COLORS\***

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily removed . . . Write for circular.

\*Purple shipped unless otherwise specified

**MICHIGAN CHROME & CHEMICAL COMPANY**  
6340 E. Jefferson Ave. • Detroit 7, Mich.

# WASHERS

on Tap  
as You Need Them



**When You  
Make Them  
The HOVIS  
Way**



Simply invest in HOVIS UNIVERSAL MASTER WASHER DIES. Then 5 small easily removable parts are all you need to change to make a new size washer.

Eliminate the cost of complete new dies. Make washers on short notice. Write for literature.

## HOVIS SCREWLOCK COMPANY

8096 E. Nine-Mile Rd. Van Dyke, Mich.  
Suburb of Detroit

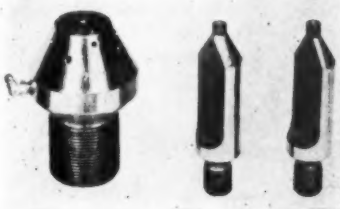
wool in both form and texture. The cutting edge of the broach forms a circle, consequently there is no tendency to produce elliptical, bell-mouthed or uneven holes.

Shearcutter Rotary Broaches are being marketed with straight shanks only, in sizes from  $\frac{1}{4}$ " to 1" by one-sixteenths and from  $1\frac{1}{8}$ " to  $1\frac{1}{2}$ " by eighths. Larger sizes can be supplied on special order.

For further information about these tools, write to the Fearless Tool Co., Dept. BB, 1234 So. Gramercy Place, Los Angeles 6, Cal.

## MACHINE CENTER

Black Drill Co., Division of Black Industries, Inc., Cleveland, Ohio, is now manufacturing and marketing a new line of patented machine centers. Initial try-outs under production conditions in many plants are said to have proved the economy of time and material which the maker claims for this new device.



This machine center set as sold consists of a single shank and an assortment of six noses which thread into the shaft. Once the shank is placed in the spindle of the head or tail stock, it never needs to be removed—simply change noses to suit the requirements of the work. By the use of this new device it is claimed that time is saved, shank wear eliminated, accuracy assured and, because noses are made of the finest high speed steel heat treated to 65 Rockwell hardness, many times the usual wear is the rule in production service.

Centers are made in a complete range of sizes (No. 2 to No. 12) for lathes and grinders, with Morse, Brown and Sharpe and Jarno tapers and with straight shanks for screw machines. Further information may be obtained by writing to the manufacturer in care of Dept. BB.

# "STAR DUST"

## LABORATORY GRADED PURE DIAMOND POWDERS

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN CARBIDE, CHROME.

- Absolute control of particle sizes
- Complete absence of out-size particles
- STAR DUST sizes as fine as .0001"
- Complete range of grit sizes

There is a STAR DUST Field Serviceman in your territory.

## ACE ABRASIVE LABORATORIES

ONE SPRUCE STREET  
NEW YORK 7, N. Y.

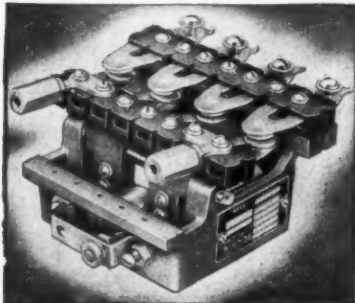
STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

**Precision LAPPING  
POWDERS for  
PRECISION work**



### HEAVY DUTY RELAY

Signal Engineering & Mfg. Co., 162 W. 14th St., New York, announces a new



heavy duty relay added to their line of heavy duty multiple arm relays, having a contact capacity of 50 amperes at 115 volts a-c or 24 V. d-c. Contact arrangement is double pole single throw, with two breaks per pole. The double break feature eliminates flexible "pigtailed" and increases the lift of the contacts.

Relay has a rigid cast aluminum frame

which is black anodized. Armature is carried on a stainless steel shaft journaled in oilite bearings, and can be counter-balanced to minimize effect of shock and vibration, when specified. Electrical contacts are of silver or special alloys, depending upon the applicational requirements.

Efficient magnetic circuit provides high working pressures at the contacts, with a power consumption of less than 3.5 watts on d-c coil windings, and 8 watts on a-c coils.

Coil windings are sealed against moisture and can be supplied with high temperature insulation when specified. Coil voltage up to 230 V. Overall dimensions: 4" x 4½" x 2½". Weight 1¾ lbs.

A new 4 page bulletin describing this relay will be mailed upon request to the manufacturer.

### CHANGE OF ADDRESS

United Precision Products Co., who have been located at 3522 W. Belmont Ave., Chicago, have moved their Chicago plant into larger quarters in Shabonna, Illinois, where they have additional facilities to continue giving their excellent delivery which they have always maintained.

*Guaranteed*

The maximum tensile and torsional strength at the point of greatest stress through controlled grain flow and distribution of metal . . . GUARANTEED . . . Know-how gained through nearly fifty years of actual experience providing the correct combination of forging engineering and craftsmanship. Contact us now for early '47 deliveries.

**PERFECT  
PERFORMANCE OF  
YOUR PRODUCT WITH  
FORGINGS**

**DROP  
AND UPSET FORGINGS**  
FROM ONE OZ. TO 50 LBS.  
Better Forgings Since 1900

**PORTLAND**

**FORGE AND FOUNDRY CO.**  
PORTLAND ★ ★ ★ INDIANA



## CHANGE YOUR DRILL PRESS INTO A TAPPER

Thrust a No. 1, 2 or 3A Dorman Tapper into the spindle of your drill press . . . insert the proper tap, tighten one set screw, adjust drill press speed and you are ready to tap holes up to  $1\frac{1}{4}$ ".

The adjustable friction drive No. 1 tapper drives from 2-56 to  $\frac{3}{8}$ " tap in steel or any other material. Simple adjustment changes from light friction to positive or any intermediate drive.

No. 2 positive tapper drives from  $\frac{3}{8}$ " to  $\frac{3}{4}$ ".

No. 3-A positive tapper drives from  $\frac{1}{2}$ " to  $1\frac{1}{4}$ ".

**DELIVERY FROM STOCK  
SOME SIZES**

*Write for details.*



## DORMAN MACHINE TOOL WORKS

355 CANAL ST. • NEW YORK 13, N. Y.

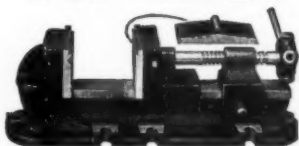
## BREMIL MFG. COMPANY

1700 Pitts. Ave., Erie, Pa.

**ALL-ALLOY** compound lever strap cutter. Cuts  $1\frac{1}{4}$  strap with one stroke.



## GEM VISES



**J. E. MARTIN MACHINE WORKS  
SPRINGFIELD, OHIO**

## McMAHON'S Magnetic Blocks

### V-100 Magnetic Block

30-45-60° Angle, with Brass Separators, Brazed in place. Size  $2\frac{1}{2}$ "x $2\frac{1}{2}$ "x $3\frac{1}{2}$ " long. Priced \$35.00 each.

### K-125 Magnetic Parallels

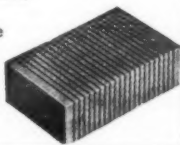
Sold in Sets of Two Blocks, with Bakelite Separators. Size,  $1\frac{3}{32}$ "x $2\frac{1}{4}$ "x4" long. Price, \$12.00 per Set.

*Write for Descriptive Literature.*

**FRANK McMAHON COMPANY**

142 S. JUNE ST.

DAYTON 3, OHIO





### COOLS WHILE LUBRICATING

The Rogers Laboratory, 257 Wooster St., New Haven, Connecticut, has introduced its Miracle Fluid, a product which cools high speed drills, special taps, dies and reamers while it lubricates. It is said to



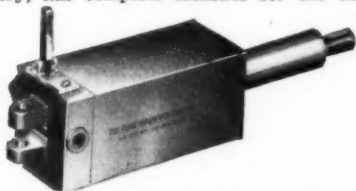
prevent burning of cutting tools, increase production and reduce cost in the tough jobs of drilling, tapping, threading, cutting and penetration.

Miracle Fluid is an aid to machinists, toolmakers, electricians, iron workers, gauge-makers, pattern makers and garage mechanics. It is non-inflammable, non-explosive and non-toxic.

Write to Dept. BB of the Rogers Laboratory for further information.

### CUSTOM-BUILT AIR CYLINDERS

The Fenn Manufacturing Co., Hartford, Conn., manufacturer of special machinery, has complete facilities for the de-



sign and building of custom-built Air Cylinders. These cylinders are designed and built to fit the customer's machine design. The design does not have to be made to fit the cylinder.

## THIS KIT of TOOLS

Fits in  
Your Pocket

- ADJUSTABLE END WRENCH
- PIPE WRENCH
- GRIPPING TOOL
- MULTI-LEVER-AGE PLIERS
- HAND VISE
- CLAMP

ALL Combined in ONE

**BMC** PRESSURE LOCK  
**WRENCH**

Six handy tools combined in a compact little-giant of a wrench that slips easily in your coveralls pocket. Gives a tight, slip-free grip of more than a ton pressure on any piece you can get hold of. Exclusive toggle arrangement applies gripping power uniformly over entire jaw surface . . . right to the very tip. Releases with a flick of the finger. Hundreds of uses in shop, garage, home or farm. Look for it today:

**NOW.. a Huskier MODEL**

Large, powerful, designed for heavy service, the new No. 11 is 11" long, has a 1 1/2" maximum jaw opening, and wields a 1 1/2 ton grip. On sale at leading hardware, auto equipment, electrical, plumbing and mill supply stores.

Three popular sizes:  
No. 7—Max. jaw opening 3/4"—Price \$2.45  
No. 9—Max. jaw opening 1"—Price \$2.95  
No. 11—Max. jaw opening 1 1/2"—Price \$4.60

**BMC MANUFACTURING CORP.**  
BINGHAMTON, N. Y.

Where space is at a premium in the design of a machine, Fenn Custom-Built Cylinders can be built to conform to the limitations of the design without altering the power or the available pressure.

Complete cylinder valve can be furnished as a separate item or as an integral part of the cylinder. Furnished in three types for air economy: Single acting; Double acting; and Differential acting.

For further information write to Dept. G of the Fenn Co.

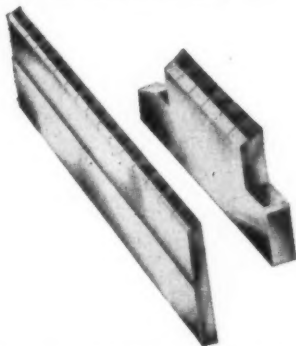
#### SEGMENT TYPE WORK REST BLADES

With many types of Work Rest Blades, tipped with a solid strip of carbide, chipping or other damage may make the blade useless for precision work and the entire blade must be replaced even though most of the carbide is still in good condition.

To overcome this, Scully-Jones and Company say they have created a Carbide-Tipped Work Rest Blade of an entirely new and novel design. The blade is segmented as shown, and damage to one or more of the segments does not re-

quire the blade to be scrapped, as it may be returned to the factory and the damaged segments replaced at low cost.

The manufacturers announce that the segment slots are self-clearing.

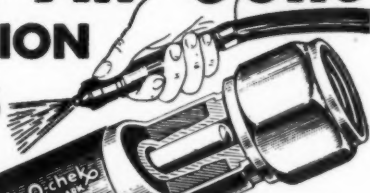


The New Carbide-Tipped Segmented Type Work Rest Blade is manufactured by Scully-Jones and Company, 1914 S. Rockwell St., Chicago.

# Air-O-chek Air Guns

## SPEED PRODUCTION

### STOP LEAKS SAVE TIME



In thousands of leading factories, machine shops, foundries, etc., Air-O-chek Air Guns are saving air, speeding production, reducing maintenance. There are many reasons. Simple construction. The exclusive ball and socket joint between valve and enclosed lever which gives full discharge with slight flex of hose. Instant, positive shut-off. No outside levers or buttons. No packing gland. Just install a dozen Air-O-cheks and compare results.

**AIR-WAY PUMP & EQUIP. CO., • 401 S. Jefferson St., • Chicago 7, Ill.**

## ETCHTOOL WITH TUNGSTEN POINTS

A newly designed Tungsten marking point is one of the outstanding features of the Combination Etchtool and Demagnetizer shown here. Especially adapted to fine, deep etching on polished sur-



faces, it is claimed that this Tungsten Point will permanently mark the hardest steel, stainless steel, or steel alloys, with the ease and legibility of a fountain pen.

This combination model (one of three electric Etchtools offered by Luma) has three stages of marking control—light, medium and heavy. Each model has 5-foot, extra flexible, lightweight cable. Combined weight of cable, cork grip pencil and marking point is only 10½ ounces. Cable is instantly detachable from etchtool.

To serve every purpose, three other marking points—Elkonite, Copper and Carbon—are also available with this tool, and all marking points are interchangeable—all have positive screw type connections.

As a demagnetizer it is especially valuable in the tool room for demagnetizing tools that have been in contact with a magnetic chuck, as it performs either operation without set-up delay.

The unit is portable and requires no permanent installation. Encased in aluminum, it weighs less than 20 pounds, making it easy to handle on any job.

Designed and manufactured by Luma Electric Equipment Co., P. O. Box 132-H, Toledo 1, Ohio.



**BOND Gears** are manufactured in a wide range of types and sizes, and stocks are carried by distributors from coast-to-coast.

*Catalog on request.*

*Manufactured by*

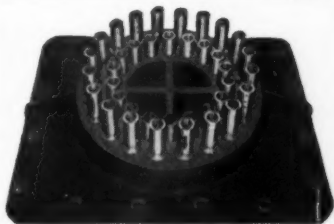
**CHARLES**

***Bond***

**COMPANY**

617 Arch St.

Phila. 6, Pa.



*Pictured: a 38-Spindle Heavy-Duty Drill Head.*

**DESIGNERS AND  
MANUFACTURERS OF  
MULTIPLE DRILLING EQUIPMENT**

*We invite your inquiry.*

**MICHIGAN DRILL HEAD CO.**

971 E. 8 MILE ROAD

HAZEL PARK, MICH.



## REICH 3-WAY PRECISION TEST INDICATOR

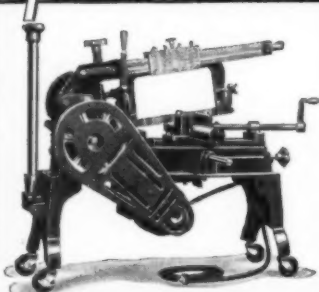
Lifetime conical bearings, stainless and non-magnetic. Sturdy construction, no returning for adjustment or service. .014" reading.

Price \$6.50.

Write for folder.

**J. R. Reich Manufacturing Co.**  
45 E. Stroop Rd., Dayton 9, Ohio

## POWER HACK SAW ★



**Low Priced      Self-Contained  
Portable              Sturdy  
Ready to Work—Economical**

EXPORT DEPT.  
1111 SO. FERRY BLD'G.  
NEW YORK 4, N.Y.

Write for Bulletin No. 200

**MILLER-KNUTH MFG. CO. OMAHA, NEB.**

## WELDED TRAILER DESIGN

An idea in welded trailer design that promises to be a boon to contractors, particularly those whose automotive equipment consists only of dump trucks, has been reported by C. W. Lytton, Franklin, Pennsylvania, field welding engineer for The Lincoln Electric Company, Cleveland, Ohio.

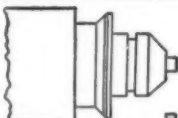
This heavy-duty trailer has the "fifth wheel" built as an integral part of the design, arranged so that it can be mounted easily in the bed of any standard dump truck body. This idea not only eliminates the need for a tractor to haul the trailer, but also permits maximum maneuverability of the outfit as compared with trailers such as those of the conventional front wheel type.

The unit, designed and built by Mead Machine and Iron Works, Warren, Pennsylvania, has a capacity of 11 tons, is 30 feet in length, and weighs 7,745 lbs.

The novel mounting arrangement as well as the main frame construction indicates that the company's engineers took full advantage of the freedom of arc welding in designing the structure. Main members consist of 8" x 8" H beams with outside members consisting of 8" channels. Skid rails are welded to the top section, sides and rear, with bull rings fused to the frame at convenient positions for securing loads.

The front structure is solidly constructed of H beams and tubular members with welding of both the intermittent and continuous types used at the joints. Welding was done with general purpose, shielded arc electrodes for mild steel.

The trailer platform has a deck height of 29 inches and is 8 feet in width. Ground clearance is 20 inches, flooring is of air-dried oak, and the unit is equipped with lights to meet all local and Interstate Commerce Commission specifications.



WHY USE  
SEVERAL  
TOOLS  
WHEN ONE  
WILL DO  
THE JOB

79 NEWBRIDGE ROAD

## FORM GROUND CARBIDE AND HIGH SPEED TOOL BITS

TERRITORIES OPEN FOR LIVE REPRESENTATIVES

**NEW MILFORD CARBIDE TOOL CO., INC.**

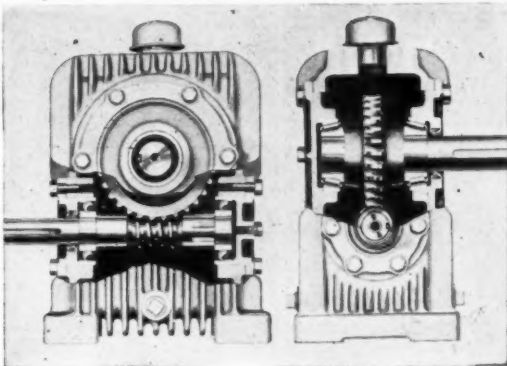
NEW MILFORD, N. J.

## COMPACT SPEED REDUCERS

A complete standardized line of compact speed reducers, built around double enveloping Cone-Drive gearing has been announced by Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Mich.

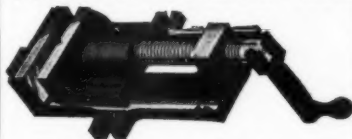
The new standardized line includes models with pinion under, pinion over, and with gear shaft vertical. Center distances of from two to 18" cover a power - transmission range equivalent to three to 24" center distance in worm gearing. The horsepower ratings range up to 800 hp input to the pinion, in the smaller sizes, models light enough to be carried in one hand are designed for fractional hp work.

Standardized Cone-Drive gear sets and standardized Cone-Drive pinion and gear mountings are used in all models. Assemblies



are either right or left hand. Available ratios range from 5:1 to 70:1. All parts for any model of a given size are interchangeable, reducing inventories and facilitating replacements.

## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens, inches	Weight Pounds
1D	3½	3½	12½
2D	5	5½	23

Do you need a vise of ANY type?

*Write today for bulletins on the extensive Yost line*

**YOST MFG. COMPANY**  
1335 SO. MAIN ST.  
MEADVILLE, PENNSYLVANIA



## DOWEL PINS



### Immediate Delivery!

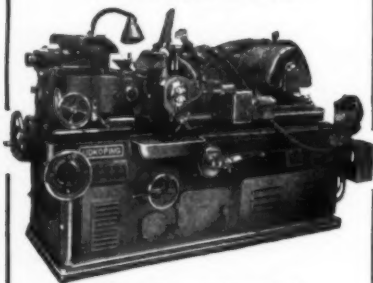
Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/8" to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

## SCHULTZ & ANDERSON CO.

109 Edison Place, Newark 5, N. J.

## SWEDISH **LIDKÖPING**

### CENTERLESS GRINDERS



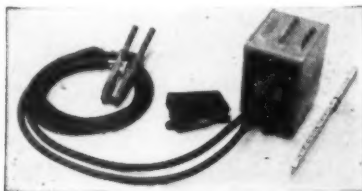
For detailed catalog write to

### **TRIPLEX MACHINE TOOL CORP.**

125 BARCLAY ST. NEW YORK 7, N. Y.

### BRAZERS THAT GO TO THE WORK

Brazing is an old but still not too generally used method of joining members of copper, brass, bronze or various alloys. One handicap has been the lack of brazing apparatus that can be readily taken to the job, as in shipyards, railroad shops, etc. For the production lines of factories,



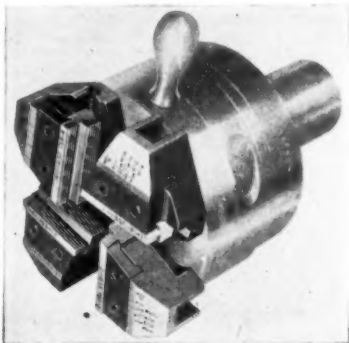
the well developed brazing furnaces are in much demand, but there has been a need for portable units for joining wire cables, strap connectors, pipe, etc. This need has been met by Westinghouse engineers with a self-contained family of brazing sets that require only a connection to a 220-volt power source. These sets

consist essentially of a transformer for providing high currents at low voltage, suitable voltage selectors, controls, and carbon-tipped tongs that can be clamped over the pieces to be joined. The high currents flowing through the carbons bring them to incandescence, quickly raising the material to brazing temperatures, which are from 1200 to 1500°F.

Three sizes, 5, 10, and 20 kva, comprise this group of mobile brazing elements. The smallest unit weighs about 30 pounds, the middle-size one 100 pounds, and the 20 kva, 250 pounds. The corresponding secondary currents are 625, 833, and 1667 amperes.

### DOUBLE DIAMETER CHASERS

The Landis Machine Co., Waynesboro, Penna., recently developed a Double Diameter Tangential Type Ground Thread Chaser.



The chasers have all surfaces and the thread form ground after hardening and are guaranteed to hold within a class three fit on the two diameters.

It is essential that the threads produced on the two diameters be of the same form and pitch.

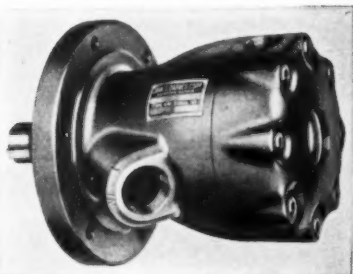
There are limitations in the difference between the two diameters for which the chasers can be furnished and each set of chasers must be engineered for the threading job on which it will be used.

Both diameters of threads on the work piece should be of a fairly short length to satisfactorily use the double diameter chaser.

Please address inquiries to Dept. BB.

### ROTO-BLADE PUMP

The John S. Barnes Corp. of Rockford, Ill., has announced another important addition to its rapidly expanding line of hydraulic structures and units. The new addition will be known as the Barnes Equalized Roto-Blade Pump.



Outstanding features of the Barnes Equalized Roto-Blade Pump are quiet operation, extremely high efficiency, long life, minimum maintenance costs, and working pressures to 1000 psi continuous or 1500 psi intermittent. This combination of features effects a major saving in initial cost through the simplification of circuit design and greater compactness in space required for a given speed and power.

The Barnes Equalized Roto-Blade Pump is available in many combinations. It can be had as a single pump, double pump, single pump with feed pump, double pump with feed pump, and a single pump with gear pump. Capacities of pump range from 8.5 gpm to 50 gpm. Thus the Roto-Blade Pump offers a degree of versatility that fits it for practically any type of application desired.

Two important factors are responsible for the long life and high efficiency of

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and surface grinding.

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# TAYLOR

MACHINE COMPANY

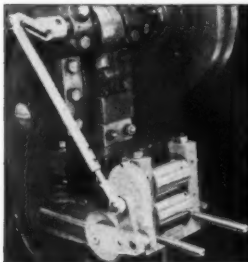
AVIATION & AUTOMOTIVE PARTS

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the Barnes Equalized Roto-Blade Pump. One is that bearing loads are neutralized by equalized and diametrically opposed radial hydraulic thrust loads. To all intents and purposes this means that bearing loads due to pressure have been virtually eliminated. The second factor is that the impeller assembly, which includes the bushing and all moving parts, may be readily removed and a new impeller assembly inserted if long service makes such a step desirable.

Complete data sheets and installation drawings will be furnished upon request to Dept. BB.



## MARTIN ROLL FEEDS

FIT ALL BENCH TYPE PUNCH PRESSES

Permit High Production at

*Extremely Low Capital Costs!*

Save in original Die Costs. Precise indexing eliminates half holes. One operator can tend several presses. Available for immediate delivery. We also specialize in the manufacture of Small High Production Dies.

Quotations given promptly upon receipt of prints.

Write for descriptive literature or ask your dealer.

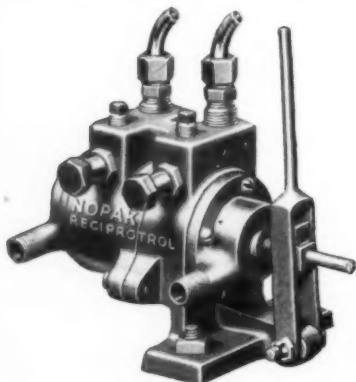
# RESCO

2020 SANTA FE AVENUE  
LOS ANGELES 21, CALIFORNIA



### VALVE CONTROLS

The Nopak Reciprotrol Valve recently introduced by the Galland-Henning Mfg. Co. provides a combination of control features which they say have never before been offered in a single 4-way valve,



in operating any size or make of air cylinder at line pressures from 50 to 300 lbs., either air or oil hydraulic.

First, it regulates stroke speed in both directions independently. For example, a doubleacting cylinder may be operated at top speed in one direction and at one-quarter speed on the return stroke.

Second, the built-in controls, which are a feature of this valve, permit accurate regulation of the stroke-length from the full length of the piston rod to a small fraction thereof.

Third, the fractional cylinder stroke may be located, precisely, at any desired point within the full stroke length.

Reciprotrol is adaptable to fully automatic, semi-automatic, or manual operation. Because it uses its own exhaust to reverse its operating cycle with explosive speed, it permits up to 500 reciprocations per minute on small diameter, short-stroke air cylinders. The control shaft floats on airplane type "O" packings which require no oiling, but will endure for many millions of cycles.

The  $\frac{3}{8}$ " pipe size in which the Reciprotrol Valve is built makes it suitable for most oscillating applications. In addition to operating any size or make of double acting cylinder, it can also be used to operate two single-acting, spring-return

cylinders. It may also be set up in batteries to operate a large number of cylinders simultaneously in succession.

Information may be obtained from the Galland-Henning Mfg. Co., 2754 S. 31st St., Milwaukee 7, Wis.

### HAND TACHOMETER

A new improved hand tachometer is the claim in an announcement by the O. Zernickow Co., 15 Park Row, N. Y. 7, N. Y. The manufacturers say that this is not a delicate instrument and is unaffected by such outside influences as electricity, magnetism, changes of temperature, etc.



The following items are indicated directly on the tachometer:

- a—The rpm, right or left.
- b—Surface or peripheral speeds in rpm.
- c—Speed variations occurring during a fraction of a revolution.
- d—Any belt slippage—waste of power.

The company is also equipped with a tachometer service department for repairing or recalibrating.

For information concerning the specifications and advantages of this instrument write to Dept. BB of the Zernickow Company.



### NEW LIGHTING AID

In the October issue of the MACHINE TOOL BLUE BOOK (Pg. 324) there was an item on a new and interesting product. This was the Light Projector which was announced by the W. Buchele Co., 1309 Milburn Ave., Toledo 6, Ohio.

The Projector has many new features and should be extremely useful in many fields. At the time of the announcement, however, the manufacturer had not decided upon a name. Since then they have named it "Inspect-A-Hole."

### HI-SPEED PUNCH PRESS

The Peterson Hi-Speed Punch Press is claimed to have many outstanding features and advantages. A bulletin covering these has been issued by the manufacturer. This may be obtained by writing to Dept. BB, Woolley Division, Hammel-Dahl Co., 233 Richmond St., Providence 3, R. I.

A large photograph illustrates the Punch Press very clearly and its nomenclature is given with the aid of numbers for each part.

A few of the special features announced by the manufacturers are:

- 1—Centralized Lubrication.
- 2—Micrometer Adjustment for Punch.

3—Oilite Bearing and Bushings.

4—Built-in Starting Switch.

5—Veelos Adjustable V Belt.

6—Ball Bearing Connecting Arm.

This improved model Automatic Press is powered by a  $\frac{3}{4}$  hp motor at 1750 rpm. The press has an adjustable speed which can be varied from 200 to 500 strokes per minute. Other speeds are available upon application.

### GAUGING PROBLEMS

An interesting handbook has been published by the Abdite Gauge Co. This was designed to aid in the combining of skill and modern equipment to solve your gauging problems.

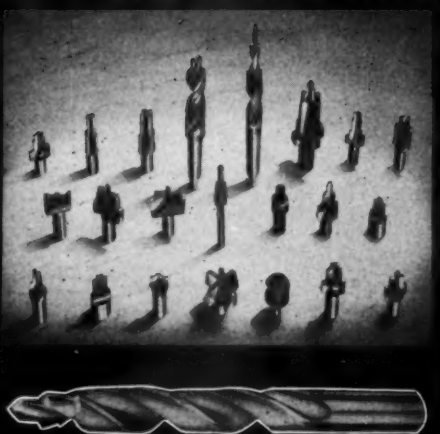
The background of the Company, and more particularly that of the three men who are at the head of it are given. The experience of these men will naturally be of vital interest to all who are concerned with the gauge business.

A list of their complete complement of modern equipment is given to show the facilities which are available. Many types of gauges for various uses are illustrated.

This book may be had from Abdite Gauge Co., Dept. BB, 5405 Oakman Blvd., Dearborn, Mich.

## Spiral PRECISION TOOLS . . .

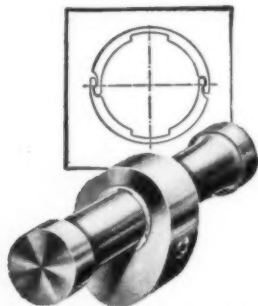
Make your tooling problem ours. We are equipped to make cutting tools of all kinds to YOUR SPECIFICATIONS, or our engineers will design the proper tools to do your job. YOU CAN BANK ON OUR DELIVERY PROMISE. We make Eccentric Relief Cutting Tools, Corbaley-Tipped Cutting Tools, Step Drills, Step Reamers, etc. Tolerances are maintained exactly. Send us your sketch or blue print for quotation. If it is a Cutting Tool We Make It.



**SPIRAL MANUFACTURING CORP.**  
3612 NO. KILBOURN AVE. CHICAGO 41, ILLINOIS

## TWO-PART INTERLOCKING RETAINING RINGS

Among the war born developments in retaining rings now available, is a new ring of two-part interlocking construction. Fitted over a shaft in a radial direction, the ring forms a complete annular shoulder of uniform section height around the circumference of the shaft thereby eliminating the wide gap characteristic typical of conventional open type "C"



rings. This feature is said to substantially increase the normal thrust capacity of the ring.

Consisting of two mating halves that interlock, the ring is of dynamically balanced design and therefore particularly suitable for equipment involving high rates of rpm such as spindle speeds of textile machinery. It is claimed that because of its positive interlocking action, the ring cannot be lifted out of its groove by high centrifugal forces or by linear expansion caused by friction with abutting parts or surfaces. Yet, disassembly of the ring requires nothing more than a slight prying action with a screw driver.

Samples and data sheets giving full description and specifications of this new development—identified as the Truarc Interlocking Ring, Type 5107—may be obtained by writing Waldes Kohinoor, Inc., Long Island City 1, N. Y.—Dept. BB.

## SOCIETY FOR METALS MEETS

Eighteen educational lectures dealing with four important and timely metallurgical subjects will feature the technical program of the American Society for Metals during the National Metal Congress and Exposition at Atlantic City, New Jersey, November 18th thru 22nd.

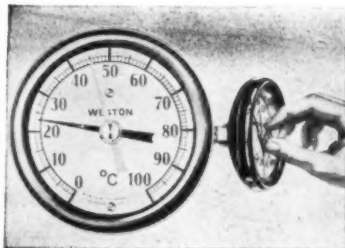
W. H. Eisenman, secretary of ASM, pointed out that in addition to this series of lectures, more than seventy technical papers will be delivered during the five days of National Metal Congress—ASM meetings.

Walter S. Tower, president of the American Iron and Steel Institute, will be the principal speaker at the annual banquet of the Society on Thursday, November 21st.

The banquet will climax the ASM 28th annual convention which is held as a part of the National Metal Congress and Exposition.

## SHOWS MINIMUM OR MAXIMUM TEMPERATURES REACHED

A new all-metal thermometer known as the Max-Min, which indicates the maximum or minimum temperatures



reached, has been introduced by the Weston Electrical Instrument Corporation, Newark, N. J.

Similar in other respects to the standard Weston all-metal thermometer, the new Max-Min, has an auxiliary red index which is manually set by a finger knob.

The pointer will move the index to the lowest or highest temperature reached during any operating period, and the index will remain at that point until manually re-set.

It is claimed that this thermometer fills the need for a low-cost device which will provide an accurate record of high or low temperatures, such as on transformers, sterilizers, ovens, chemical equipment, etc., as well as in many processing operations thruout industry. Complete information is available from Weston, Dept. BB.

### FLEXIBLE SHAFT MACHINES

Wyzenbeek & Staff, 841 West Hubbard St., Chicago 22, Illinois, announces a new 16-page folder on their line of Wyco Flexible Shaft Machines and Wyco Tools. This circular includes descriptions and prices of the various types of Flexible Shaft Machines produced by Wyzenbeek & Staff along with illustrations and descriptions of accessories available. This circular is available upon request.

### FLOATING TYPE LIVE CENTER

The Red-E Special Floating Type Live Center, is said by its manufacturers to insure accuracy in sharpening piloted reamers.

Except in the smaller sizes, the majority of hand reamers in use today are of the expansion (solid tooth) or of the adjustable (inserted tooth) type. The sharpening of the expansion type hand reamers creates quite a problem. A common method is to adjust such a reamer oversize a sufficient amount, grind it cylindrically to the exact size desired, and then back off the flutes so that sharp cutting edges are produced. However, this method does not necessarily insure that the reamer flutes will be ground

concentric with the front pilot surface, which guides the reamer in the hole. This consideration is important, especially in the case of hand reamers.

The Ready Tool Co., of Bridgeport, Conn., manufactures the Red-E Special Floating Type Live Center for sharpening expansion hand reamers which they say insures this concentricity. The procedure is to first adjust the expansion plug of the reamer so that the highest micrometer reading obtainable is from .002" to .004" over the nominal size. The amount of oversize involved depends upon the size and condition of the reamer. The reamer, with the setting of the expansion plug undisturbed, is then placed between centers on a universal tool and cutter grinder. The unique feature of this set-up is the center which supports the expansion plug end. Being a floating type center it permits centering the front pilot surface with an indicator. The reamer is now set up so that the flutes may be ground concentric with the plug.

The amount of flute stock ground per sharpening is said to be reduced and the reamer's life increased.

For information about this and other products of this company write for their catalog from Dept. BB.

**M-B** **MODEL HD-CR**  
**40,000 RPM**



**"HEAVY DUTY" Pneumatic GRINDER**

A powerful, versatile tool—can be fitted with three different spindle noses to handle mounted wheels with 3/4-inch diameter shanks, also unmounted wheels with 3/4-inch diameter and 3/8-inch diameter holes. Made with compound rotors, an abundance of power. Fitted with steel body, a real safety feature. Special grease-sealed bearings, no lubrication required.

Representatives in Principal Cities.

**M-B PRODUCTS**  
130-134 E. LARNED ST.  
Detroit 26, Michigan, U.S.A.

**ARTUS PLASTIC SHIM**  
**AND**  
**FEELER GAUGE STOCK**



The **COLOR** tells the **THICKNESS**

- Long lasting plastic, replaces scarce metal. Each thickness a distinctive, easy to identify color. Impervious to oil. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together...\$3.75

Order today. Immediate delivery.

**INDUSTRIAL PRODUCTS SUPPLIERS**  
106 Water St., Dept. H, New York 5, N. Y.

## PRODUCTION LINE EXHIBIT

An operating production line manufacturing a stainless steel household product will be a feature of the Metal Congress exhibit of the Federal Machine and Welder Co. of Warren, Ohio, and its subsidiary company, The Warren City Manufacturing Co. Demonstrating the production teaming possibilities of Warco Production Presses and Federal Automatic Welders, this set-up will use one 100 ton and one 75 ton Warco OBI Press to blank, draw and trim certain parts of the product, known as a "Silent Butler," then automatically weld handles to bodies on a Federal PH-1 75 KVA press-type welder. During certain hours in the afternoon and evening the production line will be continuously in action.

Federal will also be showing a 300 KVA flash welder, a 75 KVA gun welder, a new type 30 KVA bench welder and an unusual three-in-one press type welder, with interchangeable heads.

The Taylor Hall Welding Corp., a Federal affiliate, will show two new designs of small press type welder in the 5 KVA and 10 KVA class. A Central feature of the Federal exhibit will be a tower displaying hundreds of samples representing every type of automatic resistance welding, as well as samples of press and brake production.

## BECOMES DOCKSON MANAGER

Advancement of Harold E. Piggott to General Manager of the Dockson Corp., manufacturers of Welding Equipment and Head and Eye Protection devices, was announced by C. J. Kollar, President of the Corporation.

Mr. Piggott joined the corporation over twenty-three years ago and has advanced thru the Production, Purchasing and Sales divisions to his new position as manager of the corporation's entire activities.

## CONTOUR TURNING MECHANISM

The Monarch Machine Tool Co., Sidney, Ohio, has been granted an exclusive license by the Bailey Meter Co., Cleveland, to build and market to the machine tool field a contour turning mechanism first introduced by the latter concern two years ago, it was announced by Wendell E. Whipp, Monarch's president. Woodling and Krost, Cleveland patent attorneys, represented Monarch in the transaction which involved a score of basic U. S. and foreign patents.

The unit, which may be attached to a wide range of machine tools, combines one or more air tracers with a hydraulically-operated power circuit to produce work pieces with contours which match with extreme accuracy those of a master template.

"Our decision to purchase these controls," Mr. Whipp said, "came after a number of the units already applied to metal turning machines in several of the large manufacturing plants of the country had demonstrated their superiority over other methods and devices. They represent a pioneer advance in the art and are, in our opinion, the finest and most accurate of any now used in the machine tool industry.

"While the first industrial uses of this shape-guiding or duplicating unit were limited to the control of turning, boring, and facing operations in engine lathes, turret lathes, and vertical boring mills, subsequent engineering refinements in the equipment have broadened its possibilities of application to include a number of other types of machine tools.

"Our own immediate application of these contour controls will be to four sizes of Monarch lathes, the 14, 16, 18, and 20-inch machines. Other applications will follow as rapidly as the necessary engineering can be completed."

**How to remove burrs - FASTER, EASIER, BETTER!**

With the new NOBUR tool you can burr holes faster—improve the finish of deburred parts and lower production costs by eliminating burring as a bench operation. The NOBUR tool works like a drill, making burring a fast, easy machine operation. The NOBUR tool is available in 1/16" progressive sizes from 3/16" to 1" in diameter. Write today for new complete burring folder.

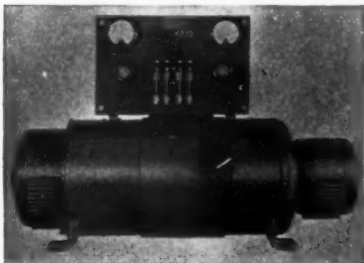
**NOBUR MANUFACTURING COMPANY**

910 North Orange Drive, Los Angeles 38, California



## LOW VOLTAGE ELECTROPLATING

A complete new line of low voltage electroplating generators is being announced by Motor Generator Corp., Troy, O. The line includes 6 models ranging in size from 100 amps at 6 volts to 2000 amps at 6 volts or 1000 amps at 12 volts.



Illustrated is the No. 130 Model which is rated 1000 amps at 6 volts or 500 amps at 12 volts. The generator is driven by a 10 hp motor at 1200 rpm. This model is popular with the job shop and manufacturer where still plating tanks are used for nickel, copper, brass or cadmium. The standard tank size normally used with this Model is 6' x 30" x 30", or a tank containing about 250 gallons of solution.

Descriptive Data Sheet MGC 30 will be mailed on request to Dept. BB of the manufacturer.

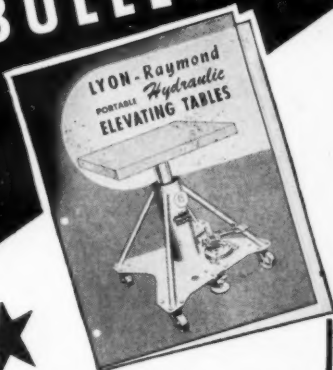
## MANUFACTURING RIGHTS

Federal Products Corp., Providence, R. I., manufacturers of precision measuring instruments, have acquired the sole manufacturing rights for the Federal-Metricator Air Gaging system. The manufacturing facilities formerly located at Ann Arbor, Mich., have now been transferred to the Federal Plant at Providence, R. I.

With this addition to the line, the company announces that there are now available Mechanical, Electronic and Air Gages of Federal manufacture as well as the very complete line of Federal Dial Indicators, to meet every possible requirement in precise dimensional inspection, and for use in Statistical Quality Control work.

For information concerning this and other products of the Federal Co., write them in care of Dept. BB.

# ASK FOR THIS BULLETIN.



## ★ SHOWS YOU HOW One Piece of Equipment...

- ★ Transports work
- ★ Elevates work to Press Bed Level
- ★ Positions work
- ★ Transfers work to different levels
- ★ Loads and unloads motor trucks
- ★ Supports overhanging work

Here are new, ingenious answers to many material handling problems found in almost any plant, provided by a single piece of equipment — Lyon-Raymond Portable Hydraulic Elevating Table. Shows labor-saving applications in actual shop views. Full details of equipment for particular operating conditions, featuring unusual adaptability, also convenience and safety provisions. Special variations (illustrated) offer suggestions your methods engineers may find helpful. More than just "descriptive literature," this bulletin offers real working information. Write for your free copy today.

**LYON-Raymond** CORPORATION

538 Madison St.

Greene, N. Y.

### TACHOMETER RECORDER

Announcement of a new, lightweight inkless tachometer recorder to provide a record of rotating speed has been made by the Meter and Instrument Division of the General Electric Company.

Designated as the Type CF-3, the recorder is designed to operate with an aircraft-type a-c tachometer generator, altho any a-c generator with suitable characteristics can be used.



Scale range of the recorder is 0 to 3000 rpm. When used in conjunction with aircraft-style tachometer generators, the minimum indicated speed under normal conditions is 600 rpm and the maximum continuous speed is 2500 rpm. Readings are claimed to be accurate to within 1.5 per cent of full scale with full-scale deflection obtained in two seconds.

The enclosing case, which is splashproof and weatherproof, is an aluminum-alloy casting with a pressure gasket between case and cover. Altho furnished in portable form, it can be readily mounted on the surface of a wall or panel.

The recorder is of the magnetic-drag type, in which a synchronous motor, built into the recorder, rotates in synchronism with the tachometer generator mounted on the device of which the speed is to be recorded. The synchronous motor is not

subject to errors caused by temperature changes at the generator, lengths of leads to the generator, or variations in generator-voltage output.

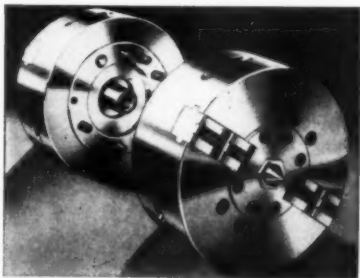
Dimensions of the recorder are 5-11/32 by 8-1/16 by 10-9/16 inches. Weight is 12 pounds.

Bulletin GEA-4703 on the tachometer recorder is available upon request from the General Electric Company. Please refer to Dept. BB of the Meter and Instrument Division.

### POWER CHUCK FOR HEAVY CUTS

A two-jaw compensating power chuck, Series 23100-A, designed to drive work on centers where exceptionally heavy cuts are being taken with carbide-tipped tools at high spindle speeds, is announced by The Skinner Chuck Co., 341 Church St., New Britain, Conn.

Compensating action of the jaws, sufficient for gripping rough-forged or cast surfaces, is provided by a rocker attached to a plunger. The center is of high-speed steel and fits into a standard Morse taper hole in the center plate. A thin nut, threaded on the maximum diameter of the taper, permits easy removal of the



center without removing the center plate.

The center plate is made of hardened alloy steel and is attached to the chuck body by six sturdy screws.

The two "floating" jaws are of the non-adjustable type. The top surfaces of the solid master actuating jaws are machined with a tongue and groove to American Standard dimensions.

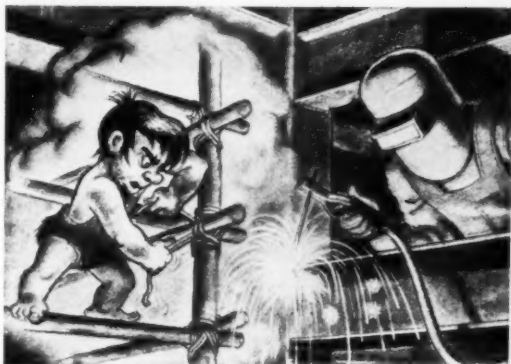
This new chuck is now available in 8" diameter size for a Type A6 and 12" size for a Type A8 spindle. It will soon be available in 10" diameter for a Type A6 spindle and 15" for a Type A11 spindle.

## ARC WELDING FILM ON DESIGN

"Design For Arc Welded Structures" is a new motion picture produced to assist architects, engineers, contractors and all people in the structural field to visualize the many possibilities in design and construction which are made possible by using arc welding. Directed by The Lincoln Electric Company, this color sound movie is another in the series of educational motion pictures recently completed by them.

Humorously portraying a cave man's attempt to join a structure with thongs, the film reviews the development of fastening methods—wooden pegs, then nails and as structural steel replaced wood, by bolts, nuts and rivets.

The company reports that another feature of this film is the showing of how arc welding permits simplified design, freedom in planning, and reduces steel tonnage. It explains the possibilities



of tubular construction and rigid frame design for efficient use of materials.

The film, which has a running time of approximately 15 minutes and produced by Herb Lamb Productions, is available in 16 mm. sound color prints from The Lincoln Electric Company, Dept. 502, Cleveland 1, Ohio at no charge except for transportation.

## WIRE PRODUCTS

The C. O. Jelliff Mfg. Corp., Southport, Conn., manufacturers of wire mesh, wire-fabricated parts, dipping baskets, and resistance wire, announces that Lektromesh, which was produced mainly for military uses during the war, is now again available to industrial users of metal screening and filter cloth.

Lektromesh is a one-piece solid metal product, with no woven or other foundation structure. The product supplements, however, rather than competes with

woven wire and is most applicable in the finer sizes beyond the limits of perforated metal, and where applications differ from those of woven wire of comparable mesh size.

A wide variety of mesh patterns can be produced in various metals. Meshes produced vary from 4 to 400 mesh.

Many hundreds of applications have been found for this unique product and the manufacturer will be pleased to send samples of the Lektromesh to those writing to Dept. BB for their examination and consideration.



**KUTMORE**  
HIGH SPEED

**ADJUSTABLE  
HOLLOW MILLS**

**16 standard sizes—Cutting capacities 1/32" to 2". Also specials made to order.**

The KUTMORE is the only hollow mill with built-in micrometer dial adjustment. Prompt delivery—even on specials. Write for Catalog No. 15.

**CARL WIRTH & SON, 1625 Clinton Ave., N, Rochester 5, N. Y.**



# Available LITERATURE

## BACKSTANDS

Here is a bulletin which summarizes seven case studies from field engineers' reports on belt grinding and finishing with idler backstands. The cases are from seven diversified industries.



This method is the conversion of grinding, finishing, and polishing methods from the use of abrasive coated set-up wheels to factory-coated abrasive belts thru the use of idler backstands and resilient contact wheels.

Many advantages are claimed for this method. They are covered in the bulletin. It is published by Behr-Manning, Troy, N. Y. This is a division of the Norton Co.

## UNI-MATIC LATHE

A 36-page booklet, Bulletin No. 1701, has just been published by The Monarch Machine Tool Co., to describe and illustrate its new Uni-Matic lathe, the first of several new postwar automatic turning machines currently going into production at the company's Sidney, Ohio, plant.

Reproduced in three colors and spiral bound for convenience of handling, the bulletins are available upon request to

the company or to any of its sales representatives in all principal cities of the U.S.A. and Canada.

A succession of photographs is used to illustrate the versatility of machining set-ups possible with the Uni-Mats—individually motor-operated tool slides—with which the new turning machine is equipped.

Several pages of the bulletin are devoted to the electrical features and timing devices incorporated in the new lathe to permit the most efficient machining of parts at high speed. Write to the Sidney Ohio plant, Dept. BB.

## ELECTRICAL EQUIPMENT

Esco Catalog No. 46-1—BB, eight pages, two colors, describes 'Rotating Electrical Equipment' manufactured by Electric Specialty Co., Stamford, Conn., manufacturers of special motors, generators, motor-generator units, converters, and other rotating electrical products. Illustrated in the catalog are numerous types of typical units which have been made by the company. Inasmuch as Esco builds special equipment to specification and order, the catalog presents a general over-all picture of the scope of their manufacturing ability rather than specific models with definite standard specifications.

## COMPLETE LINE OF DRILLS

The Canedy-Otto Manufacturing Co., Box 58, Chicago Heights, Ill., have just published a 16-page two color catalog showing their complete line of drills.

This attractive booklet has illustrations and specifications of their various types of single and multiple head Drills with floor type and bench type and also radial Drills.

Many improvements have been added to the Canedy-Otto line which are shown in this new catalog which can be had by writing to Canedy-Otto at the above address.



## CATALOG OF PRESSES

Bliss High-Production Presses, ranging in size from 8 to 300 tons are illustrated and described in a new catalog, No. 27-A released by E. W. Bliss Company of Detroit.

The presses shown are of the company's 600 Series and were engineered to pro-



duce automatically large quantity stampings requiring comparatively short and increased strokes per minute. Three different sizes and designs of coil cradles for feeding stock automatically are also described.

Typical specimens of a wide variety of complex parts stamped out of brass, steel and aluminum with progressive and compound dies are illustrated with accompanying data describing the Bliss press used for each and the production rate achieved.

Copies of the catalog are available on request to Dept. BB.

### "REPORT TO THE PEOPLE"

In "A Report To The People", a 150-page book published by Stone & Webster Engineering Corporation, New York, for a limited distribution, the reader is given new insight into the vastness and complexity of the design, engineering, and construction problems which had to be solved during the war to keep pace with the swiftly changing supply needs of the

armed forces and the rush of scientific discovery.

"From 30-calibre ammunition to atomic bomb", the span of subject matter in this 150-page book includes the story of work in atomic energy, arms and ammunition, rubber, petroleum, naval installations, and power plants which "assisted in the manufacture, packaging, and delivery of projectiles intended to destroy the enemy."

This book is not a technical treatise on the design and construction of over a billion dollars worth of war plants in a hurry. It is simply an attempt to put between two covers, in brief pictorial form, the part played by Stone & Webster Engineering Corporation—from before Pearl Harbor to Hiroshima—in the vast and vital task of providing the world's finest equipment for our fighting men."

## RESISTANCE WELDING BULLETIN

A new enlarged edition of a bulletin describing Ampcoloy Resistance Welding Electrodes and alloys has just been issued by Ampco Metal, Inc., Milwaukee 4, Wis.

Included in the new bulletin are diagrams and information covering a new line of water cooled electrode holders. A large selection of spot welder tips is offered and the list of seam welder wheels has been greatly enlarged. Copies of Bulletin 68A will be sent on request to Dept. BB.

### "HOW TO CUT COSTS"

This new Technical Booklet, is entitled "How to Cut Costs". Its purpose is first of all to emphasize the true costs of Portable Tool operations, then to suggest specific methods for cutting costs for nine types of portable tool operations—8", 6" and 4" Straight Wheel Grinding, Cone Grinding, Cup Wheel Grinding, Sanding, Buffing, Wire Brushing, Small Wheel Grinding, Drilling and Reaming, & Screw Driving and Nut Setting.

The problems of cutting costs in each field of application are treated separately.

The material in this technical bulletin is based on actual case studies of firms which are claimed to have reduced portable tool costs. Each section concludes with a showing of the exact portable tool suitable for each type of portable tool operation and readers will find a good deal of emphasis thru the booklet on the importance of proper air conditions.

This booklet is published by the Rotor Tool Co., Dept. BB, Cleveland, Ohio.

### FLUTE GRINDER

The Blake Flute Grinder is the main feature of a new bulletin. This has a full description of the machine, taking each important part separately. Along with the description and specifications of the machine there are pictures which add greatly to the clear understanding of its features.

With the increasing use of spiral-point taps, the company says they saw the need of a grinder especially designed to sharpen this different type of tap point.

This type of tap presents some unique problems. Spiral points must avoid the possibility of having positive rake in one section while having negative rake in another. The explanation of this and other problems are discussed in this catalog—No. 466.

This may be had by writing to Dept. BB, Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Mass.

### IMMERSION PYROMETER

The new Pyro Immersion Pyrometer is described in detail in catalog No. 150 recently put out by the Pyrometer Instrument Co., 102-105 Lafayette St., New York 13, N. Y.

The manufacturers make the following statements about the features of their Immersion Pyrometer:

1—Large 4" direct reading scale on a 4¾" indicator.

2—Dust - proof, moisture - proof and shock proof case.

3—Shielded steel housing, eliminating possible demagnetization of the movement.

4—Completely self-contained.

5—No exposed lead wires.

6—Instantly interchangeable "Bare Metal" and "Protected" type thermocouples.

7—Internal automatic cold end compensator.

This descriptive matter will be sent promptly upon request to the company.

### SELECTION OF FILES

"Choosing and Using Rotary Files" is the subject of the Nicholson Technical Bulletin No. R-116.

There are many types of Rotary Files and the advice of experts is often welcome when it comes to choosing the right one. This bulletin covers the best procedure to follow when selecting a file and also gives many hints on the care of them.

Even tho the use of this type of equipment is not new to many, they may still find some useful hints on how to use files and burs.

This bulletin covers the subject of Ground Burs, both High Speed Steel and Cemented Carbide, as well as Hand Cut Rotary Files. A chart is included giving the approximate speeds of Rotary Files and Burs recommended for general applications. These include the speeds for steel, aluminum, brass, soft bronze, and magnesium.

The various advantages or relative value of Hand Cut Rotary Files and the Ground Bur are discussed.

This very useful bulletin may be obtained by a request to the Nicholson File Co., 94 Acorn St., Providence 1, R. I.

### MANUAL ON COOLANTS

Based on war experience and current use in hundreds of plants, a new 20-page manual just issued by Oakite Products, Inc., describes the advantages and economies of Oakite Soluble Oil in machining, cutting, grinding and related operations on ferrous and non-ferrous metals. In addition, the manual discusses various Oakite addition agents used to meet unusual and special machining problems on a wide range of work.

Starting point formulae for making up Oakite coolant emulsions are given for operations performed on steel, brass, aluminum and plastics. Another section of the manual supplies helpful information concerning correct mixing procedures for coolants so as to avoid inverted emulsions. A copy of the new Oakite manual may be obtained, without cost, by writing to Dept. BB, Oakite Products, Inc., 57 Thames St., New York 6, N. Y.

### DIESEL ENGINE

"Lubrication of Diesel Engines" is a very informative technical bulletin issued by the Sun Oil Co. This is a fifty-page publication and is well filled with diagrams which portray the various parts of the engine.

The Diesel Engine is covered entirely, from its history to its maintenance and operation. This bulletin should prove very educational literature as well as a good reference.

There are 16 sections, a few of which are: Fuel Injection Systems, Starting and Ignition Systems, Viscosity Temperature Charts, and a Trouble-Shooting Chart.

This bulletin may be had by writing to Dept. BB, Sun Oil Co., Philadelphia 3, Pa.

### MILLING MACHINES

A new 20-page colored catalog covering their line of high speed Milling Machines has been issued by the George Gorton Machine Co., 1408 Racine St., Racine, Wis.

This is catalog No. 1400-c and includes machines of adjustable ram-knee type, with vertical and universal heads.

A feature which the manufacturers claim is exclusive is the ability to convert from a Milling Machine to a Duplicator in 5 minutes. This is done by adding a Gorton Tracer Head and Duplicator table.

The universal heads are claimed to be of improved design, with vernier adjustments and single lever locking. Machines are assembled from standard units to meet the requirements of the purchaser.

Gorton has made their engineering experience and recommendations available to assist in combining special tooling or fixtures with standard units.

### PRACTICAL DESIGNS

Practical Designs For Drilling, Milling, and Tapping Tools is written by C. W. Hinman. This book gives designers the benefit of the great amount of research that has been done in these fields.

A number of tool designs are given with the simple mathematics involved. The citations given are intended as a daily help or reference for solving similar design problems. There are many new tooling methods introduced, but all have been tested and used successfully.

The book has many illustrations of machines, tools, and setups. This should prove a very useful book.

The book is 416 pages, published by the McGraw-Hill Book Co., Dept. BB, 330 W. 42nd St., New York 18, N. Y. The price of the book is \$4.50.

### MARKING OUTFIT

The new "Utility" Marking Outfit for all interchangeable metal-marking needs is illustrated and described in detail in a bulletin published by M. E. Cunningham Company, Pittsburgh.

The "Utility" is a complete marking unit, including steel type as required and a holding tool of patented "Wedge-Grip" design, neatly packaged in an attractive sectionalized wooden box.

The bulletin illustrates how nine sizes of type can be used in a single holder. Charts show at a glance the sizes of holders and type available, the number

of characters of a given size that can be marked with holders of various sizes, and contents of complete fonts of type. The "Utility" Outfit is used for all interchangeable marking purposes.

Copies of the new bulletin describing the "Utility" Outfit may be obtained by writing this publication or direct to M. E. Cunningham Company, 228 E. Carson St., Pittsburgh, Pa.

### CHUCKS AND COLLETS

A new 2-color brochure on Proconier Quick Change Chucks and Collets has been announced by the Proconier Safety Chuck Co. These Quick Change Chucks and Collets make it possible to complete a series of operations without removing the work from alignment. Tools can be interchanged without slowing the machine—just raise the closing collar and the collet is released. Insert another collet, drop the collar and a new tool is ready for instant use. This new literature may be had without charge from the Proconier Safety Chuck Co., Dept. BB, 18 So. Clinton St., Chicago 6, Ill.

### REMOTE CONTROL

Remote Control Servo-Motor is a 2-page bulletin illustrating and describing the new Transicoil 60-cycle, 2 phase, low inertia "Servo-Motor" for remote control application. Features of construction are highlighted, and a graphic performance chart shows the efficiency of this "midget powerhouse." Immediate deliveries are available. Prices for single units and quantities will be sent upon receipt of specifications.

Bulletin available from Transicoil Corp., Dept. BB, 114 Worth St., New York 13, New York.

### COOLANT AND CUTTING OIL FILTERS

The Wm. W. Nugent & Company, Inc., 410 N. Heritage Ave., Chicago, Illinois, now offers a new bulletin covering the use of both pressure and gravity filters for coolants and cutting oils. Directed to both manufacturers and users of all types of machine tools, the bulletin describes ways and means for conserving oils, as well as for protecting cutting tools against excessive wear. Filters are available for installation as original equipment on new machine tools, or as separately connected units on existing machinery.

# Mechanics Through the Ages



## STEDUNSTAN

GOVERNOR OF ENGLAND IN THE TIME OF EDWARD THE FAIR (1254 A.D.) WAS A SKILLED BLACKSMITH AND METALLURGIST WHO HAD A FORGE INSTALLED IN HIS BEDROOM.



## AN ART

NOW LOST, BUT PRACTISED BY ANCIENT ROMAN GOLDSMITHS AND STATUE BUILDERS, WAS THE JOINING OF IVORY PLATES WITHOUT LEAVING TRACES OF THE JOINS AND WITHOUT THE DIFFERENCE IN EXTERNAL TEMPERATURES GIVING RISE TO CRACKS OWING TO RESULTANT CHANGE OF DIMENSIONS.



IN MANY SCOTTISH VILLAGES OF THE LATE 1700'S, WORKMEN CARRIED NAILS ABOUT AND USED THEM FOR CURRENCY IN PAYING FOR ALE OR BREAD.

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Production steps between the grind and the buff are reduced. Man-hour output rises; *production costs go down!*

It's Brightboy's resilient rubber and abrasive combination that does it. *The soft rubber binder cushions the abrasive.* There are production and maintenance uses for Brightboy in your plant.



Ask your dealer for Brightboy Catalog, prices and cost-saving methods and applications data. Write us if you would like to have a Brightboy production-methods man call.

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## 172 PAGES

of illustrations, diagrams, engineering data and valuable information that will help you solve your lubricating problems.



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### ELECTRONIC EQUIPMENT

Installation of the first electronic frequency converting equipment in the United States for the production melting of alloy steels at the Michiana Products Co., Michigan City, Ind., has been announced by the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

One of the principal uses of the new induction melting equipment is in the production of the low carbon alloys, such as stainless steels. Alloys which the Michiana Products Co. specializes in producing include heat-, corrosion- and abrasion-resistant types.

coils for melting 1000 pounds can be substituted in the future.

An outstanding feature of the electronic equipment is that it eliminates the necessity of an electrical operator continuously watching meters on a control board and switching capacitors into the circuit to maintain operation at the optimum frequency.

The frequency at which the furnaces operate is determined by the inductance of the furnace coils and melting steel and by the capacitance of a bank of condensers installed in the electrical equipment room.

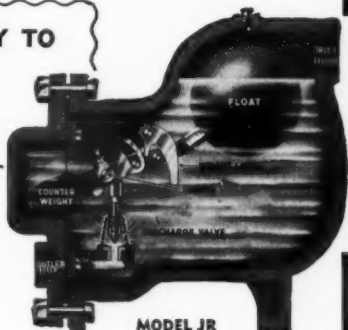
While mercury arc converters in many instances have supplanted motor - generator sets for obtaining d-c power in a variety of industrial plants, mines and steel mills, the use of this kind of unit as frequency changer for converting three-phase, 60-cycle or 25-cycle power into single-phase, 1000-cycle power has been developed only within the last four years and installations have been made only for forging and melting of non-ferrous metals.

The Michigan City installation includes a 300-kw electronic frequency changer, a steel-tank mercury arc converter equipped with vacuum pumps, a transformer to which three-phase, 60-cycle power is supplied thru a standard metal-enclosed oil circuit breaker at 6,900 volts, and two induction melting furnaces each capable of melting 650 pounds of steel, but so constructed that

# NICHOLSON WEIGHT OPERATED TRAPS

OFFERING A PRACTICAL WAY TO  
**Protect All Air Tools  
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Weight-operated for fast positive action, Nicholson air traps offer plant-proved dependable protection against corrosion and jamming of tools, and blemishing of parts caused by unwanted water and oil in air. Four types. Pressures to 1500 lbs. Stainless steel working parts. Catalog 444.



**W. H. NICHOLSON & CO., 117 Oregon St., Wilkes-Barre, Pa.**

## MILLING - DRILLING - BORING ATTACHMENT for Heavy Duty Operations

Photo shows a special operation not suited to standard straddle mill set up but easily handled by means of a RUSNOK Milling attachment used horizontally on a standard milling machine, saving one machining operation and accomplishing greater accuracy in finished piece parts. Uses many types of cutters on a wide range of work. Easily mounted—tilts to any angle. Large size spindle (No. 9 B & S taper). Takes  $\frac{1}{8}$ " to  $\frac{3}{4}$ " end mills. Large quill with 4" travel, counter balanced, hardened and ground. Six speeds 250 to 3000 RPM. Lever and worm feeds.  $\frac{1}{2}$  h.p. motor. Specially engineered by RUSNOK to meet modern demands for high speed, high precision, heavy duty end mill operations.

Prompt delivery.

Write for illustrated circular and prices.



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with McGill**  
**SOLIDEND MULTIROL Bearings**

The full length, rounded end rollers, used in the "Solidend" Multirol Bearing, increase the contact surface between the race and rollers. This gives the McGill Bearing a greater load capacity and a longer, trouble-free life. The solid retaining end shoulders built integral with the outer race eliminate flimsy end washers and loose retaining rings. As a result the Bearings can be used with or without inner raceways.

An application of these bearings is in the Boom Hoist Mechanism of Thew-Lorain Mounted Cranes and Crawler Mounted Machines. For further information write for catalog SM-42.

**MCGILL MANUFACTURING CO., INC., VALPARAISO, INDIANA**  
MANUFACTURERS OF BALL AND ROLLER BEARINGS

### AMERICAN WORKER'S DESIRE

The American workman wants a job which assures freedom of opportunity as well as employment security. Paul G. Hoffman, president of the Studebaker Corp. and chairman of the Committee for Economic Development, said in an address at Boston before the American Management Association.

Mr. Hoffman spoke after being presented with the Gantt Memorial Medal, awarded annually by the AMA and the American Society of Mechanical Engineers for "distinguished achievement in industrial management as a service to

the community." The award was said by AMA to have been made to Mr. Hoffman "for providing an inspiring, practical example of successful management-labor relations in a free society preserving the best traditions of the American heritage of individual dignity, democracy and personal responsibility; and for able leadership in developing private and public management policies to promote the general welfare by fostering a stable national economy."

He described the worker's goal, in addition to job security, as being five fold, including:

—Employment of their own choosing, that is well-paid, productive, worthwhile and satisfying.

2—Opportunity to grow and develop materially, intellectually, socially and spiritually.

3—Political freedom, the opportunity for self-government thru chosen representatives, and the attendant individual liberties of person, property, speech, press, worship, and of peaceful assembly.

4—Opportunity to live in a progressive economy that affords an abundance of things for the worker's material welfare, and under a government that promotes these goals for all the people and their children.

5—Opportunity to live in a world of peace—at home and abroad.

"All these objectives can be attained simultaneously and continuously only by maintaining our American system of capitalism," Mr. Hoffman said.

The award was presented by John A. Willard representing AMA and ASME.



### "MODERN" VISES...

are precision-built with hardened and ground jaws for rapid production work on milling machines, shapers and drill presses.

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Jaw dimensions: width 4" or 5", depth 1½", maximum opening 2" or 3".

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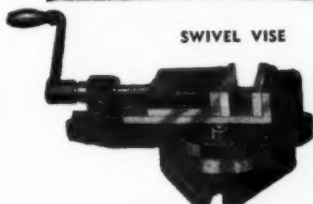
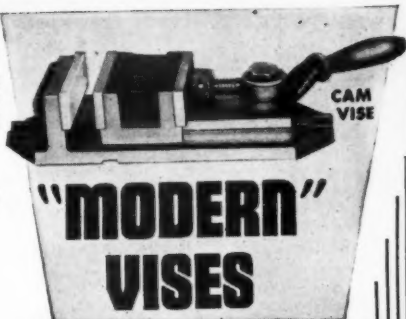
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AND CARBIDE CUTTING TOOLS.

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*Manufacturers of precision high speed  
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Here, at last, is a new tool designed to separate die sets . . . avoids makeshift prying or hammering methods. Jack is simply clamped on and handle turned to elevate or lower punch holder rapidly or slowly. A precision tool, accurately machined of finest steel and alloys.

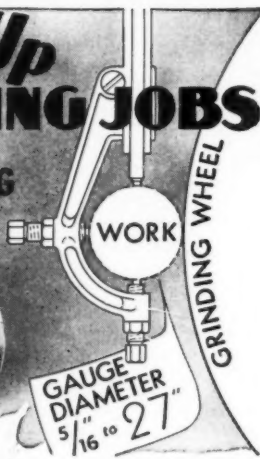
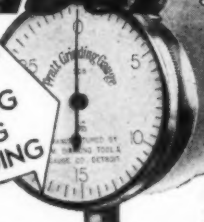
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# Speed Up GRINDING JOBS

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Pratt Grinding Gauges caliper external cylindrical jobs while work is in motion or at rest. Adapted to straight or tapered work. Tolerances of .0001" plus or minus easily maintained. Visible check on out of roundness, rough grinding and chatter. Cannot grind work undersize unknowingly. Easily installed on any grinder. Pratt Grinding Gauges increase production, eliminate scrap and assure accuracy. A modern precision tool, ruggedly built.

## American

**DIAMOND TOOL & GAUGE CO.**

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Send for Bulletin

### DISABLED VETERANS

Only one out of every five disabled veterans applying for work at public employment offices finds a job, according to statistics of the United States Employment Service for the first half of 1946.

USES statistics for July, including disabled veterans on its "active file," show that one out of 15 was placed. However, veterans on the "active file" include those awaiting adjudication, training, or some form of readjustment.

In the face of these facts, a recent study of 47 manufacturing plants revealed that disabled workers are more efficient and experience fewer serious accidents than

able-bodied workers performing the same duties and exposed to the same hazards.

This study was made by the Bureau of Labor Statistics of the U. S. Department of Labor at the request of Veterans Administration.

Some large firms, realizing the dollar - and - cents advantage in employing handicapped workers, have hired disabled persons whenever possible, altho there are growing indications that some have returned to their pre - war physical standards for employment.

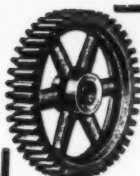
The BLS survey pointed out that smaller companies, which offer the great bulk of employment in the country, frequently have been reluctant to employ impaired workers, particularly since V-J Day.

One plant official stated, "We had many impaired workers during the war, but we probably don't have more than a dozen now."

An aircraft manufacturer stated, "Our (disabled veterans training) program was abandoned at the end of the war and no substitute has since been put into effect."

Companies not employing disabled workers are passing up a capable and efficient source of manpower, the BLS survey pointed out.

It compared performances of handicapped and non-handicapped workers as to production efficiency, absenteeism, incidence of work injuries and stability on the job.



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Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on gears of any kind. Send us your blue prints and inquiries.

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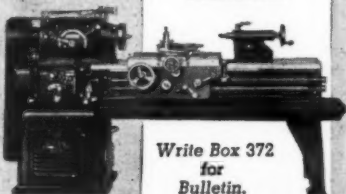
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CHICAGO 12, ILLINOIS

**CARROLL  
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JAMIESON  
LATHES  
15" AND 16"**

12 Speed Geared  
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Modern Design—  
Liberal  
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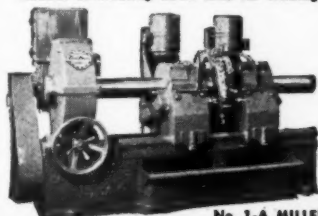
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MACHINE TOOL CO.**

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OHIO, U. S. A.

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• A combination of precision workmanship and advanced design contribute to the quality of output and quantity of work pieces produced on Roto-Matics. Production far exceeds that of standardized equipment used in the metal working industries today, because practically all operations are continuous eliminating down time for loading.



No. 1-A MILLER

Catalogue B-90 illustrating and describing various types of drilling, milling, reaming and boring machines is available on request.

**DAVIS & THOMPSON CO.**

MFRS. OF MACHINE TOOLS & MICROMETERS  
MILWAUKEE, WISCONSIN

## **USE ECONOMY — DERIVE ECONOMY**



**SOCKET HEAD  
CAP SCREWS**

**MILLED  
FROM BAR**



**HOLLOW  
SET SCREWS**

**MADE OF  
ALLOY STEEL**



**ECONOMY MACHINE PROD. CO., 5207 Lawrence Ave., Chicago, Ill.**

# How **FEDERAL PRESSES**



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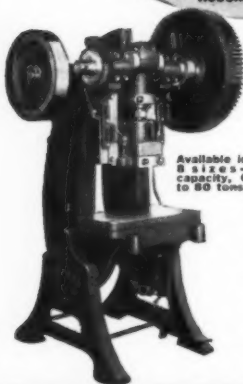
**ACCURACY**



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Available in  
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to 80 tons.

## **Eliminate the need for SPECIALIZED MACHINERY**

Factual records show that the advanced Federal Presses are performing an increasing variety of metal-working jobs never before regarded as press operations — producing hundreds of special items which formerly required expensive machinery of limited utility. And Federal Presses are equally famous for precision work — saving time and man-power, reducing costs as well. Write for catalog of complete Federal line.

## **THE FEDERAL PRESS CO.**

1802 Division St., Elkhart, Ind. — Telephone 2831

### **INTERNATIONAL TRADE**

Eighty-five non-ferrous metal plants in Germany have been officially approved for reparation by the Allied Control Council in Berlin, it was announced by the Office of International Trade.

These factories will be allocated by the Council between the Inter-Allied Reparation Agency and the Union of Socialist Soviet Republics.

The plants which are finally allocated to the Inter-Allied Reparation Agency will then be re-allocated by IARA among its eighteen member Western Nations, including the United States.

The plants which are finally allocated to the Inter-Allied Reparation Agency will then be re-allocated by IARA among its eighteen member Western Nations, including the U.S.

Included in the list are plants which were engaged in ore dressing, smelting and refining, the production of ingots, semi-fabricated and finished wrought, cast and forged products of primary and secondary aluminum, magnesium, copper, lead, zinc, tin, nickel, beryllium, manganese, vanadium and alloys.

A list of eighty-five plants may be obtained from the Reparations Staff, Office of International Trade, Department of Commerce, Washington 25, D. C. Business firms and others are invited to indicate interest which they may have in the purchase of any of the plants, in order that the United States may officially request the allocation of plants considered desirable.

Such expressions of interest should be received as soon as possible.

An expression of interest does not constitute a commitment to purchase.

Inquirers should state whether they would intend to purchase a plant for transfer to the United States or to a third country.

Where the inquiry relates to transfer to the United States, inquiries should indicate the nature of the need for, and the availability of, similar facilities within this country.

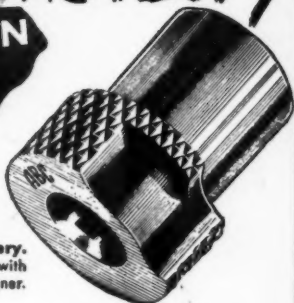
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Your KEY to

**MASS PRODUCTION**  
Will Speed up Drilling  
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## A. S. A. STANDARD PRECISION DRILL JIG BUSHINGS

Standard sizes and styles in stock for prompt delivery.  
Write for catalog showing table of standard sizes of bushings with  
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HOUSTON, TEXAS  
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W-6-8384

DAVENPORT, IOWA  
Davenport Engineering Co.  
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MAIN 6036

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South & Shaw  
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Prescott Production Tool Co.  
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## A USEFUL ADDITION

Modern precision machine shops and inspection departments will find this sturdy 36"x 48" MILWAUKEE SURFACE PLATE a valuable addition. Constructed of semi-steel, accurately machined, securely mounted on cast legs which are machined and provided with SAE adjusting screws for perfect alignment. Height from floor to top of plate 30". Can also be had in 38". Shipping weight 1200 lbs.

We also manufacture angles and parallels as shown underneath surface plate.

We also make larger and smaller plates either with planed or scraped surfaces, whichever is desired. Write today for full information.



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ENGINEERS AND MACHINISTS  
SINCE 1907

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**NOW! HEXAGON AND SQUARE**

## Precision Collets

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FOR ATLAS • LOGAN • SOUTH BEND  
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BROWN & SHARPE MACHINES AND  
MANY COLLET CHUCK ATTACHMENTS

HEX OR SQUARE Collets needed for that new job? Then say "PRECISION Collets, please!" to your industrial distributor. You'll get them now when you want them . . . from stock. And you'll get them as you want them . . . ground dead true, with a spring temper that spells assured performance, and with long life guaranteed.

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### COOPERATION IS NEEDED

America's labor problem will be solved satisfactorily only when the three branches of the nation's industrial economy—Labor, Capital and Consumer—are brought into balance and harmony.

So declares P. W. Litchfield, Chairman of the Board of The Goodyear Tire & Rubber Company in his new book "The Industrial Republic."

Mr. Litchfield points to the Constitutional balances established for the Legislative, Judicial and Administrative arms of our form of government as the pattern which should be followed.

our transportation facilities are far in advance of the rest of the world."

"If man is to enjoy more, his labor must progressively produce more, not less, in a given length of time," he says. "Labor must make its hours count for as much as possible, and management must supply the best tools and facilities it can. . . An idle dollar is as bad as an idle workman. . . The limits of potential business are bounded only by human wants, and those wants can never be satisfied."

Mr. Litchfield's book, is supplementally titled "Reflections of an Industrial Lieutenant."

He decries unchecked power in the hands of any group and believes it can lead only to national decadency. Fully conceding the right of labor to organize, he warns that "an all-powerful labor union is just as bad as an all-powerful corporation or an all-powerful state."

From a record of American progress thru co-ordination of productive effort, Mr. Litchfield reasons continued progress can come only thru harmonious co-operation directed toward efficiency and lower costs.

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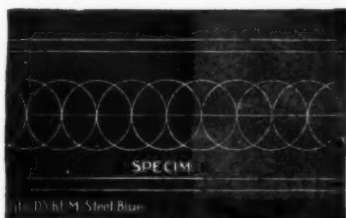
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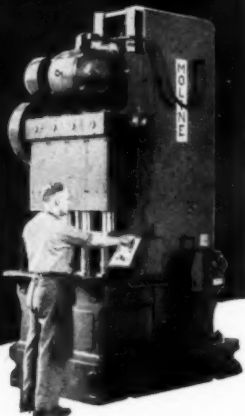


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### MACHINE TOOL RESERVE

Following the AAF's authorization for an initial industrial reserve of 12,500 machine tools, Air Materiel Command Headquarters is formulating plans for the storage of this equipment.

Just prior to the war's end, there were about 1,700,000 machine tools in the U. S. including 60,000 owned by the government. Experience in World War II showed conclusively that the immediate demands of the AAF for machine tools was considerably greater than the peacetime industry could provide. Present estimates are that the demands of the AAF in the

first year of any future mobilization would total around \$300,000,000, which contrasts with the industry total of \$195,000,000 produced in the prosperous peacetime year of 1937.

For 1942 the machine tool industry had pushed its production total to a peak of one and one third billion dollars.

This tool reserve will reduce the production load upon the machine tool industry during the critical months of any future emergency industrial mobilization. Such an industrial reserve will also contribute to the immediate expansion of military aircraft production in the event of another emergency.

A study initiated at Wright Field in 1944 determined how many of each type of tools would be required to reach a certain production

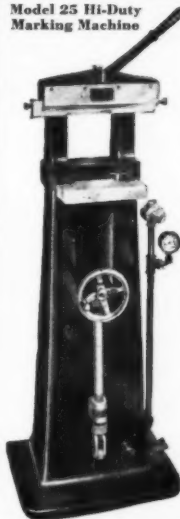
rate within a given period of time for an over all aircraft program.

The present problem revolves around the selection of the general purpose tools. Skilled AMC personnel are now examining tools located thruout the country in government-owned aircraft plants, military depots, and War Assets Corporation warehouses. Only those tools that meet a pre-determined standard are being selected for the industrial reserve.

After selection, the tools will be shipped to a strategically located storage place where they will be prepared for extended storage.



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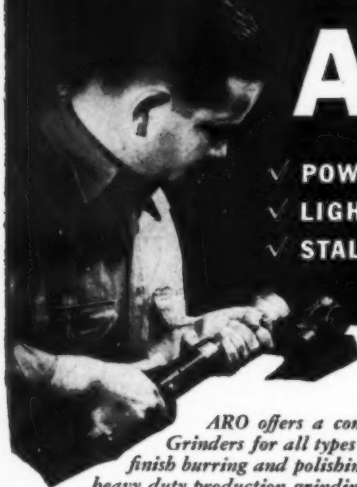
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## MATERIAL HANDLERS MEET

The first exposition to deal entirely with industry's materials handling problem, a phase of industry which represents approximately one quarter of all costs, will be held at the Public Auditorium, Cleveland, O., January 14, thru 17, 1947, it was announced by Earl I. Burke, Republic Steel Co., manager of shipping and chairman of the packaging and loading committee of the American Iron and Steel Institute.

Mr. Burke, who is chairman of the policy committee of the first National Materials Handling Exposition, declared that the Exposition will furnish the first

opportunity for production, distribution and warehousing executives to see under one roof all methods of speeding materials along production lines and thru plants from receiving depots to shipping rooms.

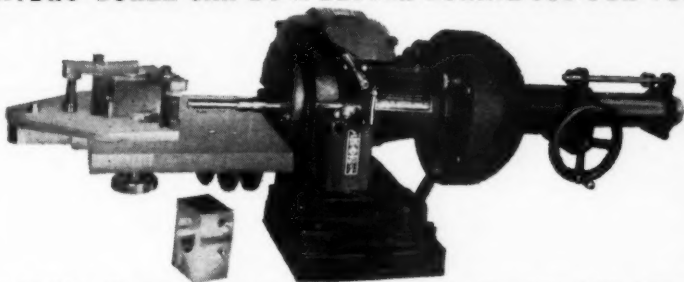
"Materials handling is one of the last frontiers for cost reduction," said Mr. Burke. "Reliable estimates place the cost of handling alone at five billion dollars annually. It is expensive and non-productive. In no other phase of manufacturing do there exist such possible savings in costs as in materials handling.

"Systems for handling must be devised before the factory is built to achieve an efficient flow of materials. However, efficient systems mean more than cost savings; they mean elimination of production bottlenecks, high accident rates and dissatisfied personnel."

A four-day program of prepared papers and discussions will be held concurrently with the Exposition. This series will feature materials handling specialists from the fields of aviation (operations and production), automotive, beverages, canning (foods and processing), ceramic, chemical, electrical, farm equipment, foundries, iron and steel, meat packing, paper, railroads, rubber, textile, warehousing, general machinery, bulk materials, and chain stores (mail order and wholesale groceries).

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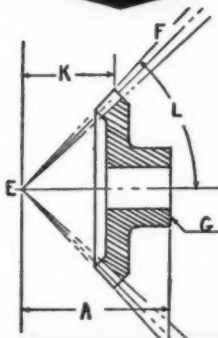
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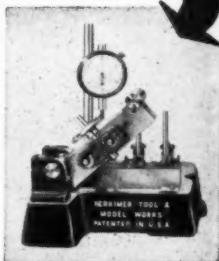


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Etc., 32-b-c, 100, 107, 132, 133, 150  
Aftercoolers, 351  
Air-Operated Equipment (Look for specific item)  
Alloys, 268  
Angles, 35, 42, 267  
Arbor Spacers, 242

Balancing Machines, 11, 77, 181, 304  
Balancing Ways, 75, 271  
Band Saw Equipment, 221  
Bearings, Oilless, 319  
Bearings, Roller, 378  
Bearings, Sleeve, 135  
Bearings, Thrust, 267, 381  
Bending Equipment, 98  
Blades, Hack Saw, 73, 85, 208  
Blocks, Magnetic, 354  
Bolts, 209  
Boring Bars, 103  
Boring, Drilling and Milling Machines, 145, 147, 261,  
377, 381, 386, 389  
Boring Heads, 62, 258  
Boring Tools, 317  
Brakes, Press and Bending, 90  
Broaches, 36, 103, 341  
Broaching Machines, 8, 9  
Burs, 19  
Burring Machines, 366  
Brushes, Wire Wheel, 82  
Bushings, Drill Jig, 214, 333, 383

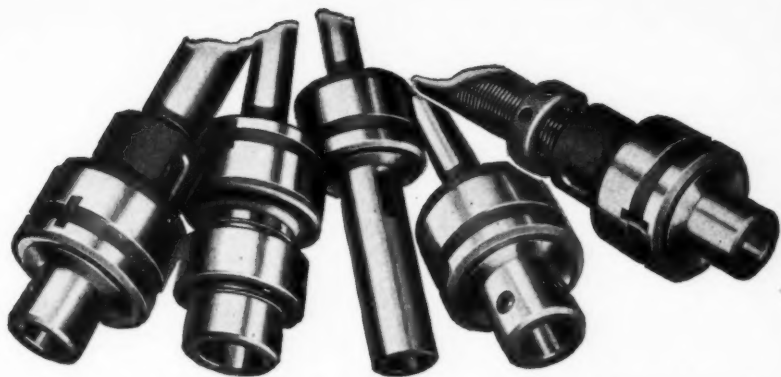
Callipers, 14, 282  
Cam Dogs, 272  
Carbides and Special Cutting Tools, Front Cover, 4,  
10, 16, 86, 91, 143, 172, 217, 231, 291, 294, 345,  
358, 363  
Centering Machines, 7  
Centers, Lathe, 335  
Centers, Live, 50, 55, 75, 125, 153, 347  
Chains and Sprockets, Back Cover  
Chuck Controls, 48  
Chucks, Air-Operated, 10  
Chucks, Boring, 266  
Chucks, Collet, 217, 234, 237  
Chucks, Diaphragm, 91  
Chucks, Drill, 44, 45, 66, 217, 271  
Chucks, Lathe, 75, 80, 193  
Clamps, 4, 32  
Clutches, 24, 102, 111, 154, 252  
Collets, 3, 384  
Comparators, 7  
Compressors, Air and Gas, 76  
Coolant Systems, 18, 68  
Counterbores, 42, 103, 151, 278  
Couplings, Flexible, 350, 381  
Couplings, Torque Control, 293, 311  
Cut-Off Machines, 121, 247  
Cutters, Fly, 78  
Cutters, Milling, 101, 256  
Cutters, Strap, 354  
Cutting Tools, 71, 103, 151, 184, 186, 343  
Cylinders, Hydraulic and Pneumatic, 113, 120, 148, 190

Demagnetizers, 75, 193, 281  
Diamond Powder, 274, 352  
Diamond Wheels, 274  
Diamonds and Diamond Tools, 213, 274, 281  
Die Filer, 320  
Die Heads, 87, 119, 189  
Die Makers' Supplies, 379, 385  
Die Making Machines, 8, 9, 31, 323  
Dies, 7, 119, 254, 352  
Die Sets, 52, 67, 345  
Die Set Pullers, 65  
Dividing Heads, 156, 193  
Dowel Pins, 359  
Dressers, Emery Wheel, 396  
Dressing Fixtures, Grinding Wheel, 200, 213, 239,  
290, 313  
Drill Heads, 188, 357  
Drilling Machines, Bench, 323  
Drilling Machines, Multiple Spindle, 56, 104, 196, 245  
Drilling Machines, Vertical, 210  
Drilling Units, 168  
Drills, Center, Core, Twist, Square, etc., 4, 53, 121,  
174, 308, 395, 397  
Drills, Portable Electric, 99, 404  
Drives, Motor, 30, 106, 247, 297, Back Cover  
Dust Control Equipment, 75, 89, 218, 404  
Dyes, Layout, 351

End Mills, 103  
Etchers, 75

Feed Fingers, 3  
Feeler Gauge Stock, 365  
Files, 163  
Files, Rotary, 15, 115, 244  
Filing Machines, 323  
Filters, 18, 47, 68, 225  
Finishing Machines, Abrasive, 347  
Fixtures, Angle Feeds, 269  
Flexible Shaft Equipment, 15, 79, 121, 143, 204, 387  
Forgings, 333  
Furnace, Heat Treating, 96, 111, 182, 264, 273, 302,  
399

Gage Blocks, 219  
Gages, 91, 126, 158, 281, 286, 380, 389  
Gear Cutting Machines, 201  
Gears and Gear Units, 297, 357, 381  
Goggles, 393  
Grinders, Abrasive Belt, 207, 334, 342  
Grinders, Air, 284, 365, 388  
Grinders, Bench, 2, 220, 226  
Grinders, Carbide Tool, 81  
Grinders, Centers, 300  
Grinders, Drill, 31, 292, 405  
Grinders, External or Internal, 117, 235  
Grinders, Pedestal, 203, 404  
Grinders, Portable Electric, 59, 76, 194, 195, 209  
Grinders, Profile, 8, 9, 39  
Grinders, Snagging, 227



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Grinders, Surface, 29, 46, 161, 179, 229, 313  
 Grinders, Sving Frame, 391  
 Grinders, Tap, 405  
 Grinders, Thread, 7  
 Grinders, Tool and Cutter, 31  
 Grinders, Tool Post, 404  
 Grinding Attachments, 233  
 Grinding Wheels, 187, 375  
 Grooving Tools, 287  
 Guards, 197  
 Guides, Saw, 285  
 Guides, Tap, 255  
 Guns, Air, 351, 356

Hammers, 321  
 Heads, Boring, 62  
 Heads, Facing, 189  
 Heads, Tapping, 69  
 Hinges, 236, 345  
 Holders, Die, 66  
 Holders, Tap, 66, 99  
 Holders, Tool, 4, 55, 173, 184, 391  
 Hones, 311  
 Honing Machines, 122, 386  
 Hooks, Belt, 164, 348  
 Hydraulic Equipment (Look for specific item)

Illuminating Devices, 183, 316  
 Indexing Heads, 305, 345  
 Indicators, 11, 137, 280, 286, 295, 358  
 Inspection Devices, 280, 286  
 Iron Worker, 64

Jig Bore, 146, 192, 325  
 Jigs and Fixtures, 112, 222, 236, 337  
 Joints, Universal, 116

Keyseaters, 230, 236  
 Knurls, 176, 359

Lacers, Belt, 164, 348  
 Lapping Equipment, 158  
 Laps, 269  
 Lathe Attachments, 139, 165, 211  
 Lathes, Automatic, 7, 11, 38, 165, 171  
 Lathes, Bench, 2, 12, 13, 43, 72, 165  
 Lathes, Engine and Toolroom, 57, 130, 165, 215, 381  
 Lathes, Polishing, 72, 121, 165, 215, 325, 404  
 Lathes, Production, 49, 123, 165, 325  
 Lathes, Turret, 7, 11, 84, 128, 130, 165, 181  
 Layout Materials, 294  
 Locators, Optical, 312  
 Lock Pins, 269  
 Lubricants, 6  
 Lubricators, 65, 376

Magnifiers, 94  
 Magnifiers, Head Band, 306  
 Maintenance Materials, 144, 247  
 Mandrels, 319  
 Marking Machines, 281, 387  
 Milling Machine Attachments, 265  
 Milling Machines, Bench, 13  
 Milling Machines, Hand, 322  
 Milling Machines, Horizontal, 26, 325  
 Milling Machines, Universal, 60, 152  
 Milling Machines, Vertical, 8, 9, 17, 70, 93, 105, 210, 346  
 Mills, Hollow, 151, 369  
 Mills, Rolling, 54

Parallels, 212, 267, 354  
 Planers, 83, 147  
 Plates, Surface, 75, 149, 267, 383  
 Polishing Machines, 334  
 Porting Wheels, 375  
 Portulators, 323  
 Positioners, 265  
 Press Brakes, 32a, 90

Presses, Arbor, 41, 270, 325  
 Presses, Drill, 26, 121  
 Presses, Foot, 275, 295, 336, 343, 382, 385  
 Presses, Hydraulic, 61, 90, 109  
 Presses, Punch, 177, 232  
 Presses, Spring, 210  
 Pullers, 65  
 Pullers, 381  
 Pumping Units, 401  
 Pumps, 76, 185, 311  
 Pumps, Coolant and Lubricant, 74  
 Pumps, Hydraulic, 61, 139, 249  
 Puncher, 290  
 Pyrometers, 346

Reamers, 103, 331  
 Rectifiers, 193  
 Retaining Rings, 95  
 Riveting Machines, 118, 309, 331  
 Roll Feeds, 361  
 Roll Forming Machines, 245

Safety Devices, 331  
 Sanding Equipment, 99, 348  
 Saw Sharpeners, 228, 343  
 Sawing Machines, Hand, 92, 121, 137, 234, 343  
 Sawing Machines, Circular, 343  
 Sawing Machines, Contour, 27  
 Sawing Machines, Hack, Inside Front Cover, 137, 193, 343, 358  
 Saws, Slotting, 37  
 Screw Drivers, Power, 291  
 Screw Machines, Automatic, 93  
 Screw Machines, Hand, 12  
 Screws, Cap, Set, Socket and Machine, 381  
 Screws, Transfer, 162, 257  
 Separators, Moisture, 351  
 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 119, 190, 202, 247, 315, 341, 343, 361, 385  
 Shapers, 26, 63, 83, 167, 325  
 Shearing Machines, 167, 168, 198, 259  
 Sine Bars, 14, 35, 389  
 Slotting Machines, 290  
 Soldering Equipment, 166  
 Spacing Collars, 305  
 Speed Reducers, 176, 296, 381  
 Spindles, Grinding, 324  
 Spot Facers, 42  
 Spring Winders, 385  
 Sprockets, Back Cover  
 Stamps, 178, 216, 279, 347  
 Steel and Steel Stock, 33, 134  
 Steels, 33  
 Stock Stands, 244, 337  
 Superfinishing Machines, 11, 181

Tables, Elevating, 351, 367  
 Tables, Rotary and Index, 70, 287, 347  
 Tachometers, 75  
 Tapes, Measuring, 137  
 Tap Extractors, 342  
 Tapping Attachments, 15, 69, 238, 294, 315, 354  
 Tapping Machines, 58, 110, 310, 323  
 Taps, 31, 88, 119  
 Threading Machines, 189  
 Tools, Threading, 160  
 Tools, Turning, 394  
 Tote Pans, 162  
 Tracers, 169  
 Transmissions, 344  
 Traps, 377  
 Turning Machines, 25  
 Turrets, Lathe, 253  
 Tracers, 169

Valves, 51, 61, 109, 113, 246  
 Vises, Bench and Machine, 159, 170, 175, 193, 240, 269, 325, 351, 354, 359, 379

Welding Equipment and Supplies, 1, 22, 23, 28, 29, 124, 303, 403  
 Wrenches, 4, 355

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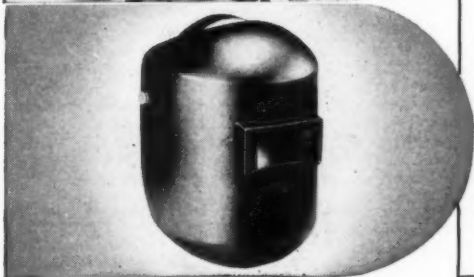
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5/32"	12	9	1.50	23/64"	12	9	2.50
11/64"	12	9	1.50	3/8"	12	9	2.50
3/16"	12	9	1.50	25/64"	12	9	2.75
13/64"	12	9	1.60	13/32"	12	9	2.75
7/32"	12	9	1.60	27/64"	12	9	3.00
15/64"	12	9	1.75	7/16"	12	9	3.00
1/4"	12	9	1.75	29/64"	12	9	3.25
17/64"	12	9	1.85	15/32"	12	9	3.25
9/32"	12	9	1.85	31/64"	12	9	3.25
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9/16"	15	12	7.00	7/8"	15	12	12.00
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5/8"	15	12	8.00	15/16"	15	12	13.00
21/32"	15	12	8.00	31/32"	15	12	14.00
11/16"	15	12	8.25	1"	20	15	16.00
23/32"	15	12	8.50	1-1/16"	20	15	17.00
3/4"	15	12	8.50	1-1/8"	20	15	18.00
25/32"	15	12	9.50	1-3/16"	20	15	20.00
13/16"	15	12	11.00	1-1/4"	20	15	22.00

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# Index to Advertisers

Abart Gear & Mach. Co.	176
Accurate Bushing Company	383
Ace Abrasive Laboratories	352
Acme Diamond Tool Company	281
Acme Industrial Company	214
Acme Tool Co.	42
Acorn Bearing Co.	267
Aeromark Co.	281
Aero Metal Stamping Co.	65
Air-Tool	267
Air-Way Pump & Equipment Co.	566
Alco Tool Co.	66
Allied Products Corp.	290
Almond Co., T. R.	271
Alofs Mfg. Co.	281
Amendola & Co., Michael	385
American Air Filter Co.	225
American Diamond Tool & Gauge Co.	380
American Measuring Instruments Corp.	282
American Saw & Mfg. Co.	73
American Tool Works, Inc.	281
Anderson Bros. Mfg. Co.	271
Andersons, Inc.	254
Arguto Oilless Bearing Co.	349
Armstrong-Blum Mfg. Co.	Inside Front Cover
Armstrong Bros. Tool Co.	348
Armstrong Bros. Tool Co.	4
Arm Equipment Corp.	388
Arter Grinding Machine Co.	179
Atlantic Gear Works	297
Atlas Press Company	26
Automatic Machine & Tool Co.	269
Auto Moulding & Mfg. Co.	236
Avey Drilling Machine Co.	104
BMC Mfg. Company	355
Baumbach Mfg. Co., E. A.	345
Bay State Abrasive Products Co.	107
Bear Mfg. Co.	304
Behr-Manning	100
Benchmark Mfg. Co.	60
Benton Co.	280
Beverly Shear Mfg. Co.	198
Blauer Mfg. Co.	385
Blank & Buxton Machinery Co.	70
Bond Co., Charles	357
Boyer-Schultz Corp.	209-318
Bremil Mfg. Co.	354
Brouer Electric Mfg. Co.	218
Brewer Mch. Co., W. F.	336
Bridgeport Machines, Inc.	17
Brown Corp., W. R.	240
Brown Engineering Co.	311
Brown & Sharpe Mfg. Co.	139
Bryant Chucking Grinder Co.	117
Hub & Son, George F.	236
Buckeye Brass & Mfg. Co.	155
Buffalo Forge Co.	64
Buffalo Mchz. Co.	293
Burke Machine Tool Co.	346
Burr & Son, J. T.	236
Busch Co., J. C.	383
Cal-Cutter Co.	101
Carboloy Company	313
Carborundum Co.	132-133

Carroll & Jamieson Machine Tool Co.	381
Carter Products Co.	221
Center Scope Products	312
Central Mch. Works Co.	123
Cerro-de-Pasco Copper Corp.	268
Chandler Tool Co.	180
Chicago Drilllet Corp.	222
Chicago Gear Works	222
Chicago Mfg. & Distributing Co.	381
Chicago Mfg. & Distributing Co.	6
Chicago Pneumatic Tool Co.	76
Chicago Rivet & Machine Co.	118
Chicago Tool & Engineering Co.	265
Chicago Wheel & Mfg. Co.	194-195
Cincinnati Electrical Tool Co.	404
Cincinnati Grinders, Inc.	9
Cincinnati Milling Machines	8
Cincinnati Planer Co.	147
Cincinnati Shaper Co.	167
Circular Tool Co.	37
City Machine Company	260
Clemson Bros.	208
Cleveland Automatic Machine Co.	21
Cleveland Twist Drill Co.	53
Clipper Belt Lacer Co.	164
Columbus Die, Tool & Machine Co.	385
Colwell Co., S. G.	253
Comet Tool Co.	140
Commander Manufacturing Co.	245
Comtor Company	286
Conant Tool & Engineering Co.	340
Cone Automatic Machine Co.	93
Connor Tool & Cutter Co.	174
Continental Tool Works	
Div. of Ex-Cell-O Corp.	103
Conway Clutch Co.	24
Cooley Electric Mfg. Corp.	399
Cosm Corp.	39
Coulter Machine Co., James	38
Criterion Machine Works	62
Cullen-Friestedt Co.	303
Cullman Wheel Co.	Back Cover
Curtis Univ. Joint Co.	116
Cushman Chuck Co.	80
Dahlstrom Mfg. Co.	255
Danly Machine Specialties	67
Davis & Thompson Co.	381
Dayton Rogers Mfg. Co.	305
Dearborn, Inc., Howard	55
Dearborn, J. W.	305
Delloy Metal Corp.	186
Dempsey Industrial Furnace Corp.	273
Desmond-Stephens Mfg. Co.	213
Detroit Die Set Corp.	52
Detroit Power Screwdriver Co.	291
Detroit Stamping Co.	242
DeVlieg Machine Co.	261
Diamond Wheel Industries	311
Diehl Machine Wks., G. M.	128
DoAll Company	27
Dockson Corporation	393
Dorman Machine Tool Wks.	354
Dreis & Krump Mfg. Co.	32-3
Drive-Air Mfg. Co.	297
Dykem Co.	385

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- Simple and economical to operate.
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2. Quickly normalizing and annealing small parts.
3. Convenient for high speed pre-heating.
4. Expedites emergency repairs.
5. Predetermining production heat treating technique.
6. Harden and draw in the same furnace with assured temperature control at either heat.

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1. **Counter Weighted Vertical Lift Door** conserves heat where door need not be fully opened. Replaces hinged hearth door at \$20.00 additional on MH-3, MH-4—standard on MH-5.



2. **Heavy Gauge Steel Stand** locates furnace at most convenient operating height and provides additional working and storage space. Add \$35.00 to regular price.

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Type	Chamber Capacity	Amps 115 V	Watts	Amps 230 V	Price
MH-3	8"W 6"H 14"L	29.6	3400	14.8	\$146.00*
MH-4	10"W 6"H 18"L	.....	4500	19.6	\$222.50*
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Export Manager, 44 Whitehall Street, New York, New York

Eastern Tool Supply Co.....	256
Economy Mch. Products Co.....	381
Economy Tool & Machine Co.....	333
Eisler Engineering Co.....	124
Electro-Matic Products Co.....	48
Elgin Tool Works.....	12-13
Elmes Engineering Works.....	61
Enco Manufacturing Co.....	211
Errington Mechanical Laboratory.....	315
Esco Engineering Corp.....	337
Etna Machine Co.....	54
Etico Tool Company.....	190
Evors Co., Henry A.....	178

Fakes & Co., Jos. B.....	350
Falcon Tool Co.....	231
Fearless Tool Co.....	36
Federal Foundry Supply Co.....	247
Federal Machine & Welder Co.....	22-23
Federal Press Co.....	382
Fellows Gear Shaper Co.....	201
Fenn Mfg. Co.....	120
Firth-Sterling Steel Co.....	33
Flexnec Company.....	144
Ford Manufacturing Co., M.A.....	244
Ford Motor Co. (Johnson Div.).....	219
Foster Engineering Co.....	295
Postoria Pressed Steel Corp.....	18
Frank Specialty Co.....	233
Fulfillo Specialties Co.....	74

Gairing Tool Co.....	278
Galland-Henning Mfg. Co.....	113
Gallmeyer & Livingston Co.....	Inside Back Cover
Garbner Machine Co.....	187
Gear Grinding Machine Co.....	111
General Die & Stamping Co.....	384
General Eng. & Mfg. Co.....	63
Genesee Mfg. Co., Inc.....	351
Geometric Tool Co.....	389
Gerotor May Corp.....	348
Gilman Engineering & Mfg. Corp.....	215
Gisholt Machine Co.....	11-181
Gits Brothers Mfg. Co.....	376
Glenzer Co., J. J.....	391
Gorton Machine Co., Geo.....	169
Govro-Nelson Company.....	108
Graham Mfg. Co.....	170-176
Grant Mfg. & Machine Co.....	331
Gray Mills Corp.....	401
Greaves Machine Tool Co.....	331
Greenard Arbor Press Co.....	270
Grenby Manufacturing Co.....	161
Grinders & Fixtures, Inc.....	345
Grob Brothers.....	331
Grobet Pile Co. of America.....	115
Gruen Gauge Company.....	310

H & H Research Co.....	229
Hall Mfg. Co.....	234
Hamilton Tool Co.....	323
Hammond Machinery Builders.....	334
Hansen Clutch & Mch. Co.....	162
Hardinge Brothers, Inc.....	3
Hartford Special Machinery Company.....	175
Harvey Mfg. Corp.....	323
Haskins Co., R. G.....	79
Heimann Mfg. Co.....	257
Herkimer Tool & Model Works.....	389
Herman Stone Company.....	149
Hevi-Duty Electric Co.....	182
Hilliard Corp.....	252
Hobart Brothers.....	1
Hoggson & Pettis Mfg. Co.....	279
Hovis Screwlock Co.....	352
Howe & Son, Inc.....	343
Humm Safety Equipment Co., John.....	244
Hydro-Borer Co.....	389
Hypro Tool Co.....	88

Ideal Industries, Inc.....	75
Independent Pneumatic Tool Co.....	82
Industrial Products Suppliers.....	365
Ingersoll-Rand.....	185

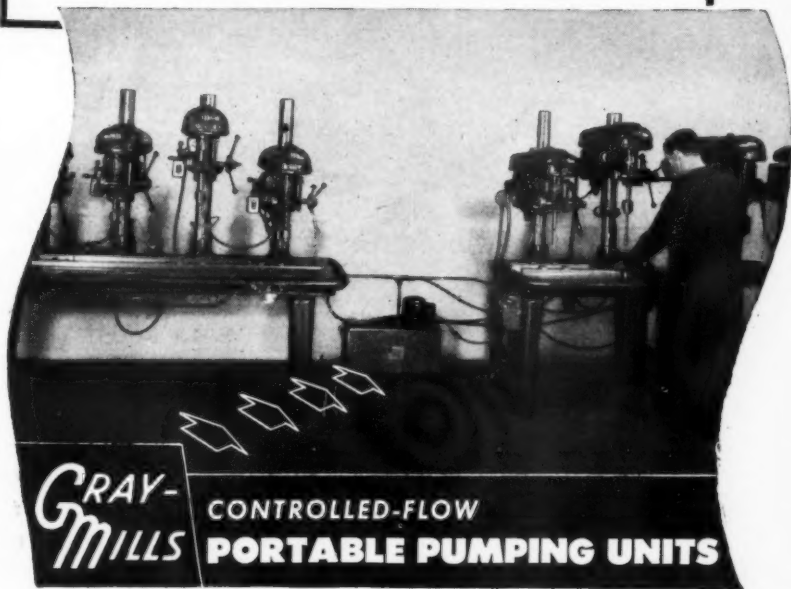
J. & S. Tool Co.....	200-239-315
Jacobs Mfg. Co.....	44-45
Janette Mfg. Co.....	296
Jarvis Co., Chas. L.....	15
Jefferson Machine Tool Co.....	156
Johnson Div. (Ford Motor Co.).....	219
Johnson Gas Appliance Co.....	302
Johnson Machine & Press Corp.....	295
Jones & Lamson Machine Co.....	7

Kennametal, Inc.....	172
Kingsbury Machine Tool Corp.....	196
Knut-Vise Inc.....	32

L. & J. Press Corp.....	343
L-W Chuck Co.....	193
Lafayette Tool & Supply Co.....	287
Leach Machinery Co., H.....	20-152
LeBlond Machine Tool Co., R.K.....	165
Leckinger Machine & Experimental Co.....	278
Lehmann Machine Co.....	49
Leiman Bros. Inc.....	314
Lenox Instrument Co.....	183
Lewthwaite Machine Co., T. H.....	343
Libert Machine Co.....	236
Linna Electric Motor Co.....	350
Lincoln Electric Co.....	28-29
Lincoln Park Industries, Inc.....	Front Cover
Lincoln Park Mfg. Co.....	Front Cover
Linley Brothers Co.....	146
Littell Machine Co., F. J.....	331
Logan Engineering Co.....	43
Lovejoy Flex. Coupling Co.....	350
Lucas & Son, J. L.....	162
Luna Electric Equipment Co.....	166
Lyon Machine Co.....	287
Lyon-Raymond Corp.....	367

M-B Products Co.....	365
Metzill Manufacturing Co.....	378
McMahon Co., Frank.....	354
Machine Products Corp.....	267
Macmillan Co.....	343
Madison-Kipp Corp.....	284
Mall Tool Company.....	203
Mark Specialty Co.....	172
Marshalltown Mfg. Co.....	168
Martin Machine Wks., J. E.....	354
Master Tool Co.....	269
Maytag Inc., Machine Sales Association.....	192
Maxwell Co.....	258
Mead Specialties Co.....	246
Meyers Company, W. F.....	16
Michigan Chrome & Chemical Co.....	351
Michigan Drill Head Co.....	357
Midwest Tool & Engineering Co.....	351
Miller Knuth Mfg. Co.....	358
Milwaukee Chaplet & Mfg. Co.....	320
Modern Motor Drives Div. (Nichols Eng. Co.).....	247
Modern Tool Works.....	87
Modern Tools.....	379
Molina Ind. Diamond Co.....	274
Moline Tool Company.....	386
Monarch Machine Tool Co.....	257
Moore Industries, J. C.....	226
Moore Special Tool Co.....	212
Morey Machinery Co., Inc.....	84
Motor Tool Mfg. Co.....	50
Mummert-Dixon Company.....	361
Murphy & Co., James A.....	351

# 7 SPINDLE DRILL PRESS CONVERTED TO WET-CUTTING FOR ONLY \$14.25 PER SPINDLE



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National Acme Co.	119
New Albany Machine Mfg. Co.	232
New Britain Tool & Mfg. Co.	351
New-Field Machined Parts Co.	75
New Method Steel Stamps, Inc.	347
New Milford Carbide Tool Co.	358
Nichols Eng. Co. (Modern Motor Drives)	247
Nicholson & Co., W. H.	377
Nicholson File Co.	163
Nielsen, Inc.	347
Nielsen Tool & Die Co.	162
Nobur Mfg. Co.	366
Norgren Co., C. A.	47
Norton Company	32b-32c
Numeral Stamp & Tool Co.	216

O. K. Tool Co.	10
Oliver Instrument Co.	31
Oliver Machinery Co.	234
Oliver Motorcraft Corp.	317
O'Neil-Irwin Manufacturing Co.	98

Paddock Tool Co.	285
Persson Mfg. Co.	379
Plunket Machine Co., J. E.	159
Pneumatics, Inc.	148
Pope Machinery Corp.	32-4
Porter-Cable Machine Co.	207
Portland Forge & Foundry Co.	333
Potter & Johnston Mch. Co.	173
Pratt & Whitney	19
Proemier Safety Chuck Co.	69
Production Machine Co.	347
Producto Machine Co.	110
Prosser & Son, Thomas	81
Pryton Machine & Tool Co., D. H.	58
Pryometer Instrument Co.	346

R & L Tools	394
Racine Tool and Machine Co.	109
Reading Machine Co.	230
Redner Air Devices Corp.	40
Reich Mfg. Co., J. R.	358
Reid Brothers Corp.	46
Reitool Corp.	308
Republic Drill & Tool Co.	127
Resco	361
Rhodes Mfg. Co.	290
Rivett Lathe & Grinder, Inc.	2
Robbins Eng. Co.	35
Rockford Clutch Div.	154
Rockford Machine Tool Co.	83
Rogers & Co., Inc., Samuel C.	227
Rooft Machine Wks., Inc.	125
Ross Operating Valve Co.	51
Rotor Tool Co.	59
Rouse & Co., H. R.	322
Rustok Tool Works	377
Rutland Tool Service	202
Ryerson & Son, Inc., Jos. T.	134

S. & E. Machine Products	237
S & S Machine Works	345
Sales Service Machine Tool Co.	177
San Angelo Foundry & Machine Co.	240
Sanford Manufacturing Co.	225
Schaner Machine Co.	72
Scherr Co., George	14
Schmarje Tool & Engineering Co.	345
Schmidt Inc., Geo. T.	387
Schultz & Anderson Co.	359
Screw Machine Specialty Co.	247
Semly-Jones & Co.	217
Sellers & Co., Wm.	262
Seneca Falls Machine Co.	171
Sentry Company	114
Service Machine Co.	97
Severance Tool Industries	184

Sheldon Machine Co.	325
Siewek Tool Co.	112
Simonds Saw & Steel Company	85
Simonski, Gilbert S.	96
Size Control Company	158
Skilsaw, Inc.	99
Smith Boring Chuck Co.	266
Sommer & Adams Co.	165
South Bend Lathe Works	139
Specialty Equipment & Machinery Corp.	279
Spiral Mfg. Corp.	363
Springfield Machine Tool Co.	57
Standard Transmission Equipment Co.	344
Stanley Works	94
Staples Tool Co.	71
Stark Tool Company	264
Starrett Co., L. S.	137
Stokerunit Corp.	145
Strand & Company, N. A.	387
Strand Manufacturing Co.	197
Sturdimante Tool Co.	153
Stridstrand Machine Tool Co.	77
Sumner Products Co.	122
Syntro Company	321

Tamm-Silica Co.	247
Tamewitz Works	92
Taylor & Fenn Company	210
Taylor Mch. Co.	561
Thrifmaster Products	188
Tomkins-Johnson Co.	199
Tool Supply Co.	249
Torin Manufacturing Co.	89
Trindl Products, Ltd.	403
Triplex Machine Tool Corp.	360
Troyke Mfg. Co.	347
Turner Machinery Co.	106

U. S. Electrical Tool Co.	235
U. S. Hoffman Mch. Corp.	68
United Precision Products Co.	124
Universal Engineering Co.	294

Vanderwall Co., E. H.	335
Victor Machinery Exchange	395-396-397
Vimeo Inc.	316
Vonnegut Moulder Corp.	150

Wade Instrument Co.	294
Waldes Kohner, Inc.	95
Walker-Turner Co.	121
Walls Sales Corporation	342
Walton Co.	342
Wardwell Mfg. Co.	228
Warren City Mfg. Co.	90
Weber Machine Corp.	309
Weldon Roberts Rubber Co.	375
Whalley Co., George	272
White Dental Mfg. Co., S. S.	143
Whitney Metal Tool Co.	275
Wickman Corp.	86
Wiley's Carbide Tool Co.	291
Wilson, K. R.	41
Winter Bros.	34
Wirth & Son, Carl	369
Woods Engineering Co.	348
Woodworth Co., N. A.	91
Wyzenbeek & Staff, Inc.	204

Yohe Supply Co., Wm. S.	337
Yoe Mfg. Co.	359
Young Arbor Press Co.	319

Zeiss, Inc., Carl	266
-------------------	-----



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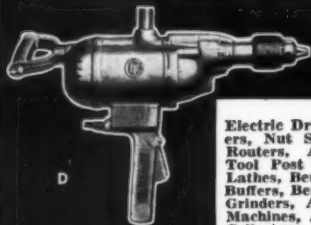
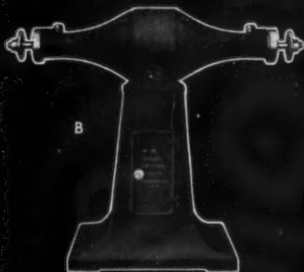
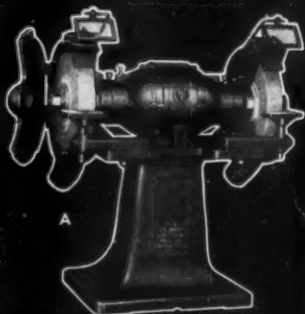
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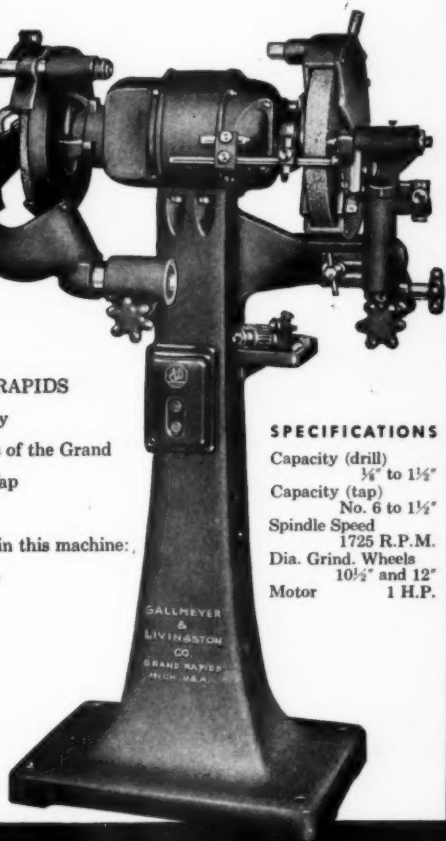
You save three ways by investing in this machine:

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and on valuable floor space.

Write for Bulletin G.L. 9-15-44

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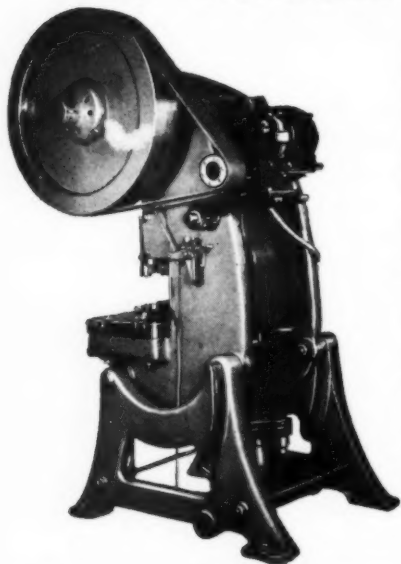
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